PMI

VOL. 1 NO. 2
FEBRUARY
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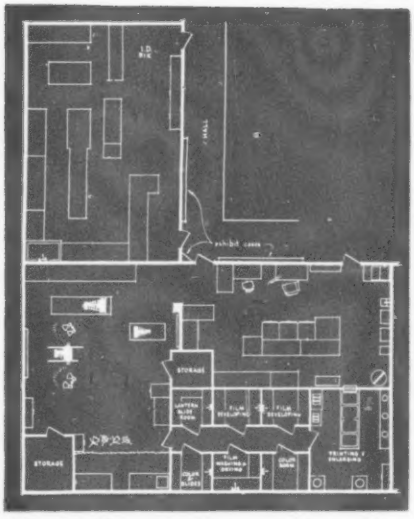
PHOTO METHODS FOR INDUSTRY



How does a top university photo department work?—p. 28

In-plant newsreel movies in a hurry—p. 42

Aerial photography can be both good and simple—p. 22

Industrial portraits 1855-1958 Have they really changed?—p. 36

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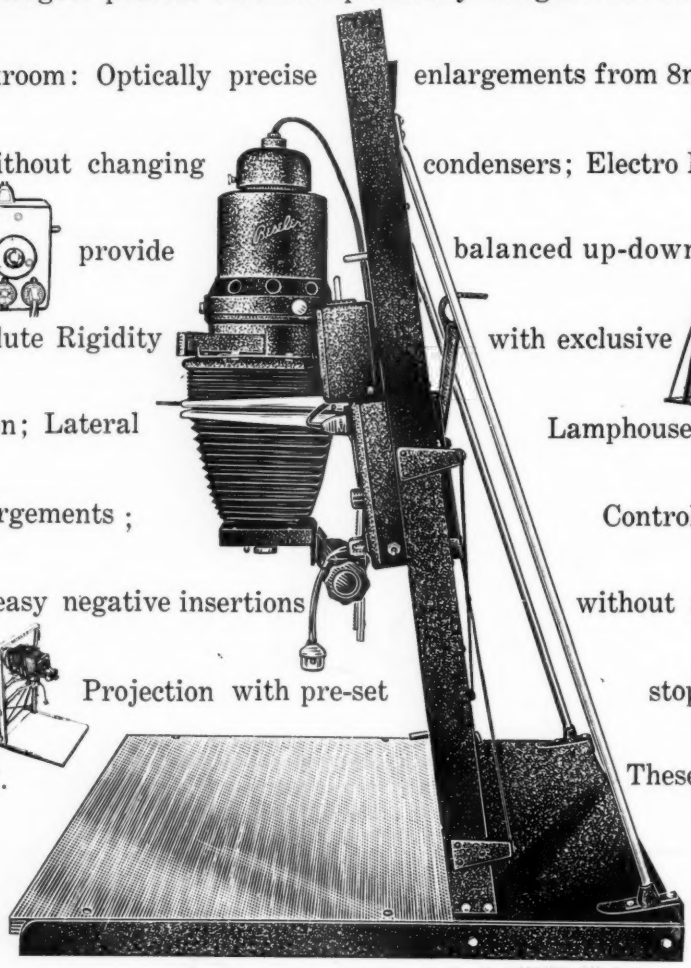

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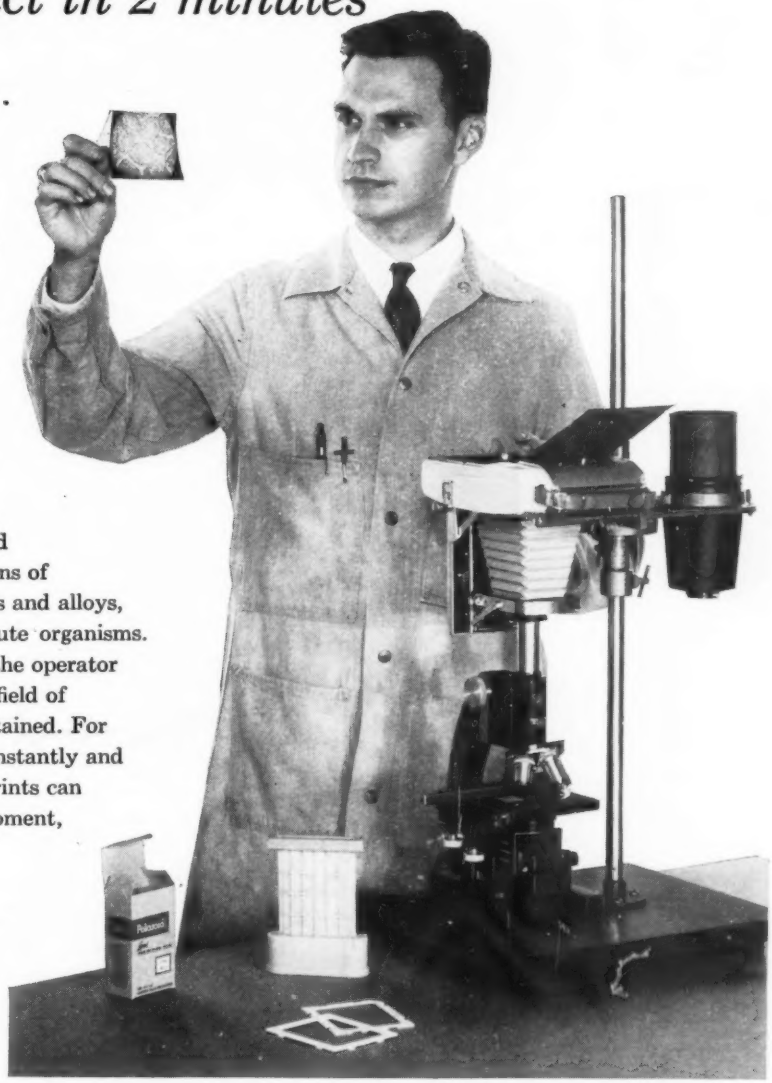

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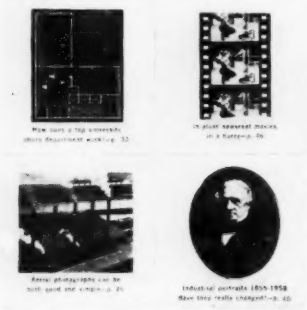

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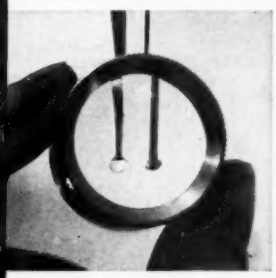
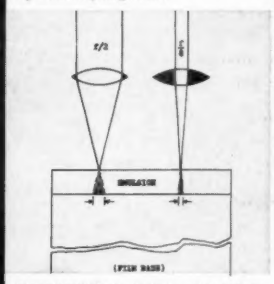


MACRO PHOTOGRAPHY—Common pin and an unfinished micro-optic under magnifier, photographed with LEICA, lens extension and VISOFLEX. Photo by Liesel Springmann.



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F.Y.I.

Pencil these on your pad:

The Besler Dream Darkroom will definitely appear at the big M.P. D.F.A. show in Chicago, March 17-21. It won't be in the Conrad Hilton, though. It'll be parked right across the way from the entrance, on S. Michigan and E. 8th St.

The General Electric Co. is holding a powwow of recording spectrophotometer users, at their West Lynn, Mass., Instrument Department, March 24 through 26. Designed for other interested parties as well as users of the instrument, the course will highlight servicing, maintenance, and common trouble-shooting techniques. Tuition and materials are free, and Arnold Aronson, GE, 40 Federal St., West Lynn, Mass., is the man to contact for the details.

"Industrial Photographic Management" is the title of a 5-day course scheduled for August 25-29, at the Winona School of Photography, Winona Lake, Ind. Instructors will be drawn from the nation's top photo executives. Professional Photographers of America, Inc., who run the course, have already announced that the lecturers will include E. S. Furrington, Ford Motor Co. photo chief, Richard C. Kinstler, photo chief at Procter and Gamble, and Earl G. Stanton, top photo man at Bell Aircraft.

Outsiders seldom realize the long history of heartbreak and ingenuity that preceded the fine continuous-tone reproduction we're accustomed to see in today's printed matter. The American Museum of Photography, however, knows all about it. Los Angeles will too, when the Museum's special exhibit saluting the Diamond Jubilee of Halftone opens there Feb. 1.

Plump and peppery, **Charles E. Rotkin** is at home in the air both here and abroad. His article on aerial photography, in this issue of PMI, is illustrated with pictures made on industrial assignments here. At New York's Overseas Press Club, until Feb. 28, he is showing a brilliant collection of off-the-ground photographs of "Europe from the Air." This is 50% of a twin exhibit. The other half is called "The U.S.A. at Work." It would take a real energetic photographer to cover Rotkin at work.

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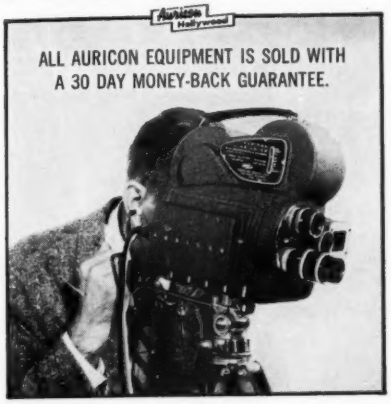

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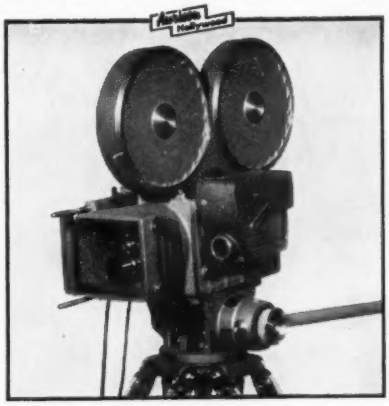

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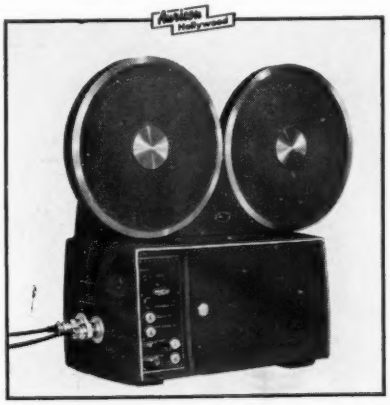

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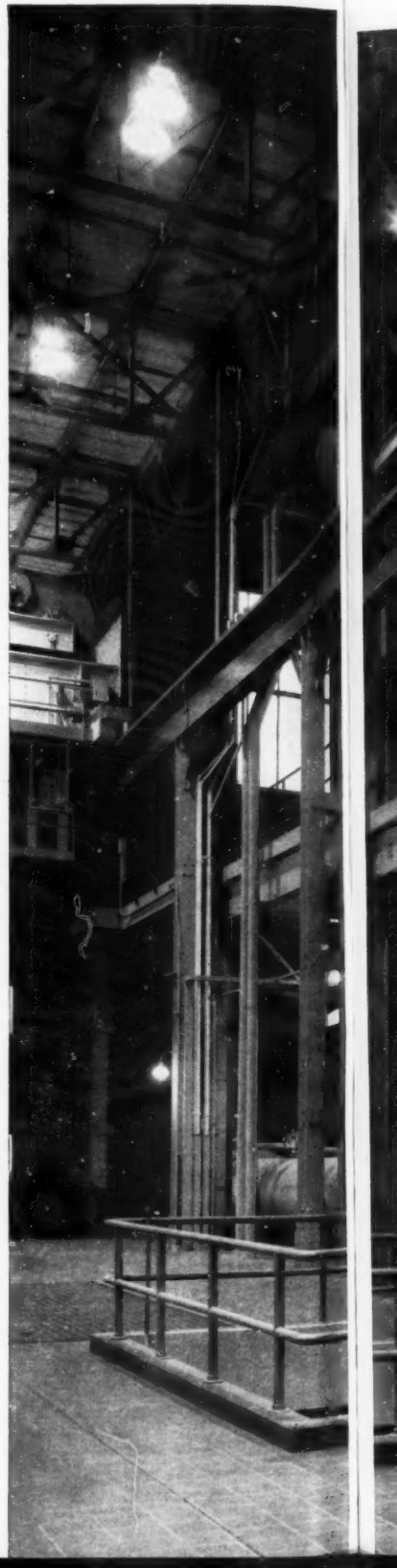

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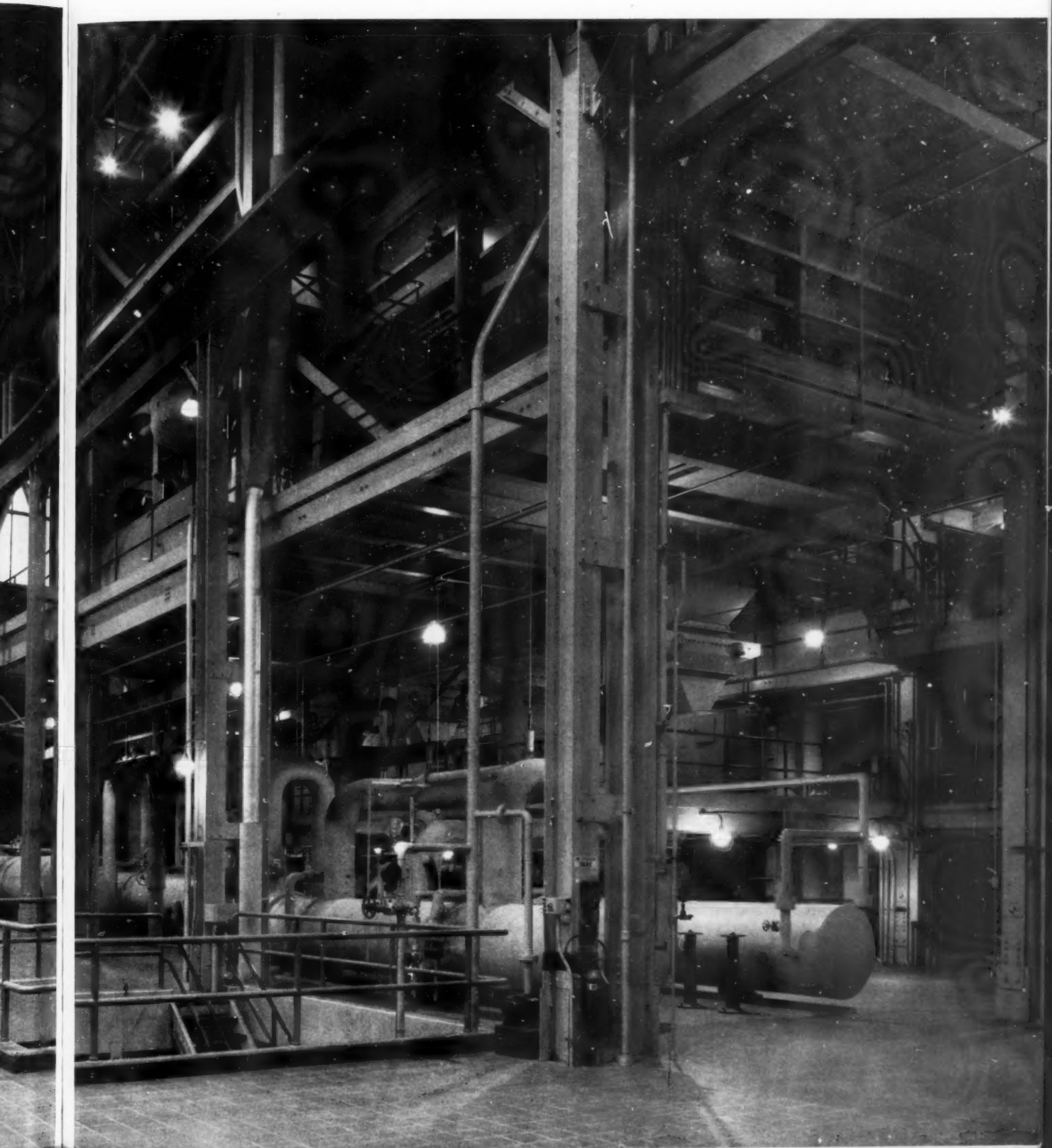

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by Edward R. Farber

ELECTRONIC FLASH

How your electronic flash unit "stops" action—and 9 ways to change its speed

Electronic flash is most notable for its action-stopping power. Of course it doesn't really stop action the way a brick wall halts a bullet. Photographic devices merely slice time thin enough so that movement is not apparent. Knowing how your electronic flash unit accomplishes this can extend its usefulness to you and help you remedy the sometimes weird effects of motion blur in electronic flash photos.

A case in point is the illustration of a golf swing. Note the blurred effect of the polished shaft, the somewhat more sharply defined ball and the relatively crisp club head. This seems to contradict the fact that the club head necessarily is traveling faster than the shaft. What's more, the shaft and ball appear to be moving backward because they are blurred on the right.

To understand this paradox, remember that electronic flash is not instantaneous. Although the light reaches peak brilliance quickly, it dies relatively slowly.

Let's refer to the sketch: The shutter opens and any existing light on the subject reaches the film. The electronic flash starts to discharge and very soon it is intense enough for mirror-like objects (such as the shaft in the photograph) to reflect sufficient light to expose the film.

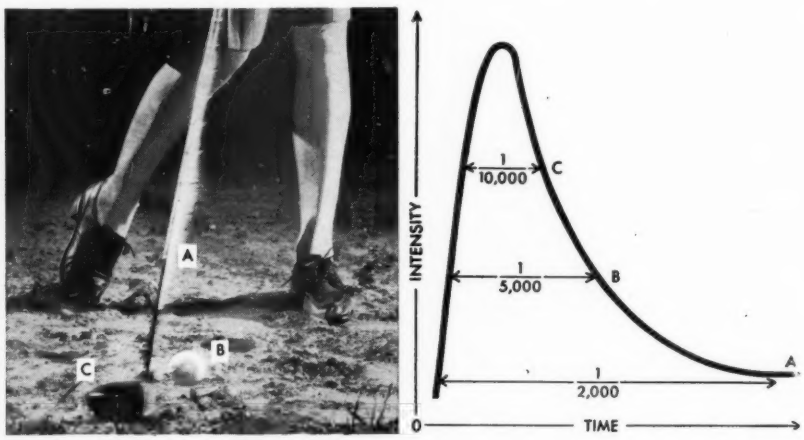
As the light gets brighter, the white objects (the golf ball) reflect image-producing light. Finally when the light nears peak intensity, the dark objects (the club head) are recorded.

The light is soon insufficient to record dark objects any longer. Their exposure is the shortest. Next, the whites reach the point of no exposure. But the polished surfaces may mirror the light source far into the "tail" of the flash. Thus the lighter the object the longer its image is recorded.

How to "soup up" the speed

But remember, if maximum action stopping is desired from a particular electronic flash setup, we should consider doing the following:

1. Avoid specular (mirror-like) reflections by the placement of lights, by spraying polished objects or by using bounce light.
2. Reduce subject contrast by proper lighting or even repainting.
3. Use minimum exposure.



BACKWARDS? Explanation is in the story.

4. Avoid high level of room light.

5. Use fastest shutter speed.

6. Use ortho film or a blue filter to reduce effect of existing incandescent lights.

The actual flash duration of a particular electronic flash unit depends on the size and type of flashtube, the size and type of capacitor, and the resistance and inductance in the discharge circuit.

The flash duration is generally defined as the time between the one-third peak points on the curve showing the rise and decay of the light pulse (1/5,000 sec. in the diagram).

For photographic computations, it might be well to use twice this duration to allow for the tailing.

You can shorten this flash time if your unit permits reducing condenser capacity (by such means as a high-low switch). Cutting the microfarads of condenser capacity in half cuts the flash duration in half. This, of course, halves the light.

You could also cut the flash duration in half by adding a second flashtube. This permits the capacitors to discharge in half the time. Although the light from each tube is lessened, total output is the same.

Therefore, to improve the action stopping of a particular flash unit:

1. Use maximum number of lights on each capacitor bank.

2. Use smallest possible amount of capacity per lamp.

3. Use shortest possible cables to the lamps to reduce resistance.

How fast is fast enough?

If you would like to calculate allowable flash duration for a certain photographic result:

1. Decide how much movement you can permit in your subject.

2. Calculate the time it will take the object to travel this distance using the formula:

Time of Travel = Allowable Distance of Movement ÷ Velocity

For example, were you to photograph a car moving 15 mph across your picture (15 mph is 22 ft. per sec. or 264 in. per sec.) and you feel that it could move $\frac{1}{10}$ in. and be adequately sharp for the final print, you substitute as follows:

$$\text{Time of travel (in seconds)} = \frac{\frac{1}{10}\text{ (inch)}}{264\text{ (inches per sec.)}} = \frac{1}{2640}$$

Thus an electronic flash rated at 1/3000 sec. would meet the requirement for stopping the car's movement. —THE END

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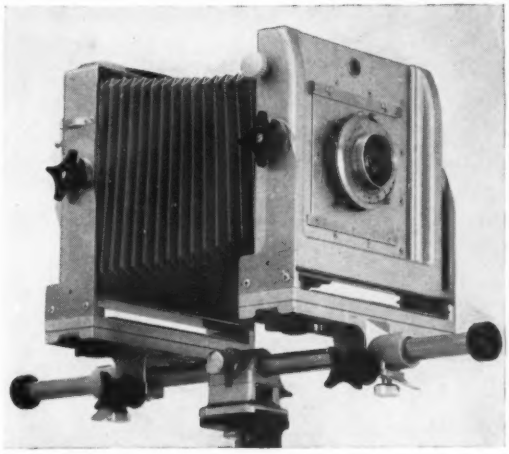

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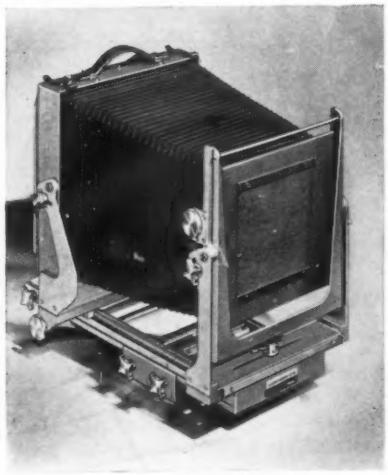

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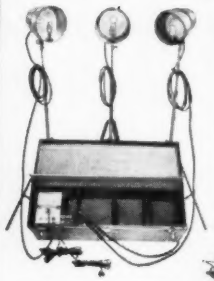

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Get more information. Circle 401, page 47

by Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Type C prints—how to get the most of a fine color innovation

Last month in this column we gave some of our impressions of the child wonder of the photographic age, negative-positive color.

All of which leads us to the innovation in negative-positive color which most stirred the professional's interest: Type C prints.

The quality of *good* Type C prints compares with the quality of Dye Transfer prints. We've never heard this point disputed by anyone who has seen them both.

On the other hand, we suppose many of you have seen Type C prints—or even had them made from your own negatives—that were of such poor quality that you thought Eastman alone had the secret of good printing. In many cases, poor Type C prints are the result of poor negatives—or lack of patience or experience on the part of the printer. It's a tricky business; a good printer still usually makes a couple of false starts before he gets a fine Type C print, hence the high original cost. The problem is *thinking* in negative color. Experienced color printers got their experience with reversal materials. If a transparency was too blue, he added yellow to cut the blue back. If a Type C print is too blue, he adds blue to the filter pack to make a warmer print. This, as you can see, is a source of difficulty for the man who has printed nothing but reversal color for years.

Color print economics

Any professional can learn to make excellent Type C prints. But we couldn't live with ourselves if we gave the impression that it's easy. More practice is needed to acquire skill with Type C printing than is needed to make good black-and-white prints. We believe that a color analyzer, accurate light and voltage control and strict temperature control are needed for consistent and efficient results. There is no economic sense in spending the time and buying the equipment unless you plan to do plenty of Type C work. Especially so when there are enough fully capable labs that do turn out superb Type C prints. However, if negative-positive color does prove to have the potential we think it has, some experimentation with Type C prints would be well worthwhile. We'll go into that more fully in a later issue. Meanwhile, we have a recommendation for getting the most from your Type C prints:

Pin down those elusive hues

When you shoot an Ektacolor or Kodacolor negative, shoot a transparency at the same time. And give it to your printer—or keep it close by if you make the print.

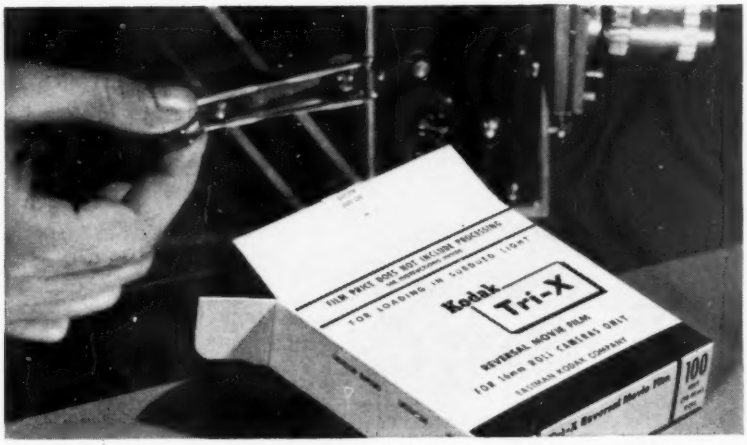
There is nothing so elusive as color value. You can't rely on any color printer, yourself included, to recall or imagine the colors in the original scene with accuracy. Since the color correction is done in the enlarger, any printer will be helped immensely by a transparency with which he can judge his effort. Naturally each emulsion does interpret colors differently, so it's unfair to expect an exact match without allowance for the differences in the two media. The purpose of the transparency is to communicate your conception of the scene to the printer. The transparency helps you get a better print.

Color negative, b & w print

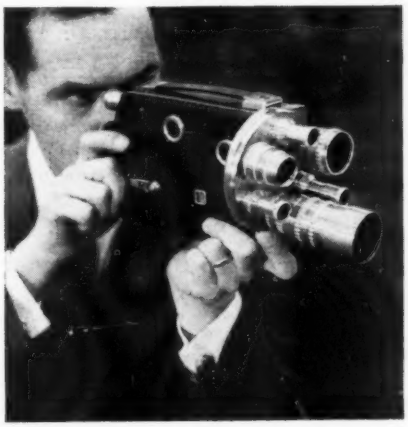
Another interesting aspect of negative color is the fact that it can render excellent black-and-white prints. Eastman recommends Kodabromide No. 3 for proofing

(continued on page 14)

Shooting a sales film in color? In plant or studio with artificial lighting, Type A Kodachrome Film is balanced for best color rendition.



Shooting in the rain, or inside with existing light? Then you'll want the high speed of Kodak Tri-X Reversal Film. Grain is moderate.



Producing a how-to-do-it film in your studio? Where lighting is ample, the fine grain and medium speed of Kodak Plus-X Reversal Film give you optimum image quality.

KODAK FILMS FOR INDUSTRY

Making a public relations movie in the field? Daylight Type Kodachrome Film gives richness and brilliance to any motion picture story.

One minute you're in the board room making movies of the president for an employee relations program. Then off you go to the factory for some time studies for plant engineering. And you're apt to end up on the water tower, coat-tails flapping in the breeze, while you shoot "aerial views" of the plant.

When your jobs are as varied as this, it's good to know that Kodak makes the films you need. There are some 30 dependable Kodak 16mm Movie Films in all. Your dealer handles most of them, can special-order the rest. And on special problems, you have personal contact with Kodak through your technical representative, whose job is to help.

See back cover of this magazine for story on Kodak K-100 Turret Camera.

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Get more information. Circle 445, page 47

INDUSTRIAL COLOR

(continued from page 12)

purposes, but for really good prints we find Varigam or Kodak's new Polycontrast papers do a much better job. Kodak recently announced a new Panalure paper with a color sensitivity and contrast especially designed for making black-and-white prints from the color negative. We judge color negatives for this purpose by viewing them through a green (No. 59 or 61) filter. In much the same way, black-and-white positive transparencies and slides can be made on any panchromatic film or lantern slide plate.

Transparencies, any size

As we mentioned last month, color transparencies can be made from Kodacolor or Ektacolor negatives. The material designed for this purpose is Ektacolor Print film, sold presently only as sheet film. It can be used for contacts, reductions and enlargements. Thus, you can use the same color negative for everything from a 2 x 2 slide to a 40 x 60-in. display transparency. The quality of Ektacolor Print film transparencies is good. A well-done transparency is suitable for any type of graphic arts reproduction.

Some engravers are experimenting with methods to bypass intermediate steps and make plates directly from the color negative. As the color masking is built into the negative, the result is less correction work on the separations.

Dye Transfer prints

You can make Dye Transfer prints from Kodacolor or Ektacolor negatives with Kodak's Pan Matrix film. Recent improvements in the resolution of this film make possible even better Dye Transfer prints from your color negative. Dye Transfer offers something that is impossible in Type C prints. Color can be contrast controlled in the exposing and developing of the matrices. Thus, finer modifications of color balance are possible, and certain negatives which make only mediocre Type C prints, may be vastly improved upon. Besides, the tonal range of Dye Transfer prints can exceed that of Type C prints: whiter whites are possible because Dye Transfer paper has an extremely white coating. Type C paper, on the other hand, has a pale cream colored base.

We'll continue to keep you posted in future columns on the burgeoning of negative-positive color, a sturdy branch of the exciting industrial photographic genre. THE END

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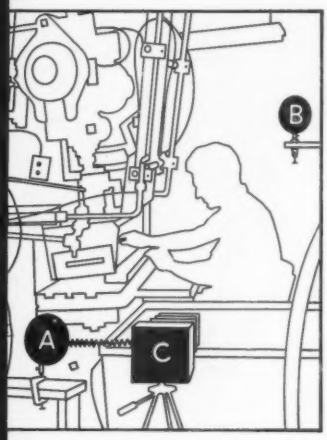

Stroboflash II (A) mounted on camera (C) trips Stroboflash II with photoelectric "slave" unit (B) used for back light and to eliminate undesirable shadows on the machine.

STROBOFLASH* slave operation saves time and provides better industrial lighting!

Industrial photos are frequently very difficult to light properly. High ceilings, cramped working space and awkward shadows all handicap the photographer. In addition, it is frequently undesirable or impossible to interrupt a manufacturing operation to be photographed.

Each of these problems can be solved with multiple Stroboflash units and "slave" operation: (1) Two or more Stroboflash units can be tripped in perfect synchronization. (2) Two or more Stroboflash II units give enough light even for action-color. (3) Stroboflash II has a flash duration of 1/1000 second to stop action. (4) By using a simple plug-in photoelectric cell the "slave" lights can be triggered; no extension cords are needed. (5) Stroboflash lampheads can be mounted in inaccessible places and you don't have to climb over obstacles replacing flash lamps for a second or third exposure. (6) The brilliant light output and brief flash duration minimize interference from overhead work lights. (7) The brief flash duration does not blind a machine operator as ordinary flash lamps frequently do.

Here, then, are seven advantages of Stroboflash common to every industrial photo. Many other problems can be solved, depending upon the specific photographic situation.

Illustrated in this ad are the Stroboflash II, $99.50 (less batteries); the Universal Quick Change Clamp, $9.95; and the Photo Tube Assembly, $9.90. Ask your dealer for this combination or write: Dept. PI-28, Graflex, Inc., Rochester 3, N. Y., for the complete Stroboflash catalog and price list.

*Trade Mark. *Prices include federal tax where applicable and are subject to change without notice.*

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IN-PLANT TEST

Bethlehem Steel Co. photographer tries Ansco's new superfast Super Anscochrome Tungsten Type film. Here's how he rates it.

SPECIFICATIONS: Super Anscochrome Tungsten Type available in 35mm, 120 and soon in cut film sizes. Color balance for 3200K (professional floods). ASA exposure index 100. Maximum exposure index with special processing 400.

Leonard Ross, photographer for Bethlehem Steel Co., reports: Our first great eye opener to Ansco color film was Super Anscochrome Daylight Type. With its ASA 100 speed, it offered an advantage no other color film had. Some of our steel shops are just as dark as night—or seem so. Sometimes you can't light them at all. At other times the amount of light you can throw into them is just plain insignificant. Super Anscochrome, Daylight Type, film allowed us to work in places we couldn't before. Where we *can* use extra illumination it goes that much further. The extended latitude of Super Anscochrome opened our eyes even more.

Now about the new Super Anscochrome Tungsten Type. Although this new film is balanced for professional floods (3200K), I frankly don't think that the film is going to find its biggest market in studio work. When you're in a limited space and can punch out as much light as you want, why not use a slower film? Where Anscochrome, Tungsten Type, really shines is in available light—as far as I'm concerned. I used it under a mixture of fluorescents, incandescents, neon and what-have-you in the way of light. I just went along shooting it under existing indoor tungsten lighting conditions the same way I would shoot black-and-white. It's very important for the photoreporter and the industrial photographer to be able to shoot that way. The Super Anscochrome Tungsten Type color balance is better for indoor lighting situations than the Anscochrome Daylight Type which generally runs a bit too warm. However, the balance of the new Super Anscochrome Tungsten Type is closer to ordinary incandescent industrial plant light than the tungsten films of other manufacturers which are usually balanced for clear flash bulbs or amateur floods. The true color that the film exhibits under mixtures of fluorescent and incandescent light is fantastic. It produces an amazing natural effect. Color rendition of yellow, red and white is very true. The film is valuable because you can use it in almost any available light condition. For instance, we were doing some spark testing using the classic example of grinding the ends of steel to determine composition. Being able to identify the exact color and type of sparks was important. With Super Anscochrome Tungsten Type results were true and excellent.

Since Anscochrome Tungsten Type was in short supply (I was only able to get 35mm) I shot only at two different ratings. One 35mm roll was used at the recommended ASA 100 while I rated the second roll at 300 and had the film pushed in processing. It is possible to use this film with a rating as high as 400 but results are rather grainy and not consistent. I used two matched Canon camera bodies and kept switching lenses so I could accurately compare the resulting shots. Naturally the ASA 100 film was a slight bit truer in color. The ASA 300 exhibited a slightly purplish cast—mostly in the shadows. But you'd have to compare it to the ASA 100 film to notice it.

There is some difference in graininess between the 100 and 300 films. The 300 is slightly more grainy, but show me even a fast black-and-white film that isn't. In any event, the 35mm Super Anscochrome Tungsten Type is certainly acceptable as far as graininess is concerned. It isn't Kodachrome, but neither is anything else. Unfortunately the slow speed, and limited latitude of Kodachrome make it all but impossible to use under existing light conditions.

PHOTO METHODS IN USE

AERIAL PHOTOS SIMPLIFY COAL PILE INVENTORIES

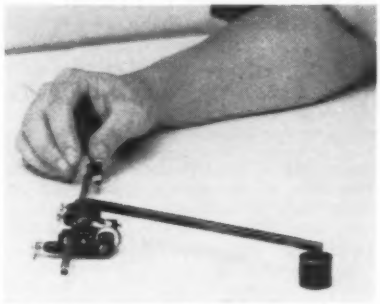
Stereo photos from air inventory coal.

Problem: tallying up large coal supplies by slow, inaccurate ground survey methods. Solution: take to the air. By using stereoscopic aerial photographs, the Ryall Engineering Co. of Lakewood, Colo., succeeded in speeding up the coal pile survey process, improved accuracy of estimates, and reduced costs by 35 to 50 per cent.

Once each year Ryall takes stock of coal on hand at four principal steam-generating plants of their client, the Public Service Co. of Colorado. The camera, a Fairchild, is designed to match stereo mapping equipment used at Ryall's for interpretation of the photos. Each coal pile and a sizeable area on all sides is photographed twice from parallel flight paths to produce the double stereo negatives. These negatives are printed on glass plates, and then plotted in contour.

In the completion phases of the job, the area enclosed by each contour is planimetered, and the volume of the coal pile is computed. This volume, or space total in cubic yards, is reported to the client who applies the correct weight factor for varieties and grades of coal in the stockpiles.

The Public Service Co. of Colorado assignment was not the first coal pile survey by Ryall's. The firm has photographed coal stockpiles of the Great Lakes Carbon Co. at St. Louis, Mo., for the past three years.



Technician uses planimeter to figure area enclosed by each contour. After area is determined, total volume can be computed, and reported to client.

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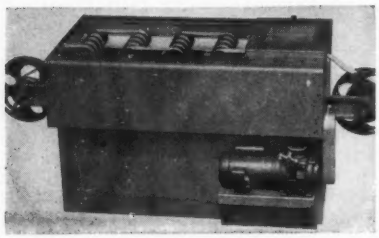

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by Herbert P. Paschel

GRAPHIC ARTS

Photocopies without a camera—new and versatile worksavers for the photographer

It's hard to imagine a plant photographer who is not called upon to make copies for record purposes or to avoid costly retyping. Doing this in the conventional way—camera negative and contact positives—is both time-consuming and expensive, to say nothing of its tying up expensive equipment and darkroom facilities. When duplicating documents becomes a daily chore it is time to consider one of the many office copying devices now available. These specialized "photocopy" techniques are faster, more convenient and more economical.

THERMO-FAX

Minnesota Mining & Manufacturing Co.

Thermo-Fax is a completely dry, one-step process. After an average five second exposure in the Thermo-Fax printer, the copies are ready for use. The system is based on a special paper containing a heat sensitive layer. Paper and original are inserted in the exposing unit with the sensitive layer facing toward the exposing source. Radiation from the infrared light sources goes through the Thermo-Fax paper and the original except in those areas containing typed or written matter. In those spots the infrared energy is absorbed, generating heat which causes the sensitive substance to darken to form the duplicate image. The sensitive copy paper is made in several weights, in white and six colors and in a variety of sizes up to 14 x 17-in. A perforated and gummed sheet is designed for the rapid production of labels.

VERIFAX

Eastman Kodak Company. Also distributed by Photostat Corp.

The Verifax process represents the refinement and application of a well-known principle—that when a photographic emulsion composed of silver salts and soft gelatin is developed in a tanning developer, a very thin layer of the unexposed and unhardened gelatin can be transferred to ordinary paper. Verifax matrix emulsions also contain a tanning developing agent and color forming components. Matrix and original are placed face-to-face and exposed by reflex—the light passes through the sensitized matrix, reflects from the blank areas of the original and strikes the sensitized material again; the combination of the two exposures add up to just enough light for darkening the matrix. Developing in a mild alkali solution (Verifax activator) hardens the exposed areas and forms a dye throughout the emulsion layer. Next, the developed matrix and a receiving sheet (a sulphite base bond paper) are squeegeed together. Upon separation, a thin layer of dyed gelatin adheres to the transfer sheet, forming a positive duplicate image of the original. The matrix can be reactivated to obtain at least five additional transfers (which, unfortunately, become progessively lighter). Verifax images can be transferred to a wide variety of card and paper surfaces and preprinted office forms as well as a special offset master plate.

DTR-Diffusion Transfer Reversal

Agfa.AG., American Photocopy Equipment Company, Ampto, Inc., Copycat Corporation, Copy-Craft, Inc., Cormac Photocopy Corp., A. B. Dick Company, Duophoto Corporation, General Photo Products Co., Inc., Gevaert Co. of America, Inc., Haloid Company, Hunter Photo Copyist, Inc., F. G. Ludwig, Inc., Nord Manufacturing Corp., Peerless Photo Products, Inc., Photo Rapid of America, Inc., Remington Rand, Rovico, Inc.

The above manufacture or distribute a photocopy system based on the same image-forming principle, all with similar materials and equipment. Special negative and positive

papers are required which are either imported—Agfa's *Copyrapid* and Gevaert's *Gevacopy*—or coated under license agreement. The common basis for these methods is a unique diffusion-transfer-reversal reaction, more commonly known as the "one-step photographic process," which has been popularized in another form by the Polaroid camera.

In making a DTR photocopy the light-sensitive paper is exposed in the usual reflex manner. The exposed negative and a positive transfer sheet (not light-sensitive) are then placed face-to-face and inserted in the special continuous processing unit. The two sheets are carried through the developing solution separately, but in unison, and next enter a set of rollers which squeegee the sheets together and eject them from the machine. During the time the two sheets are in contact, a silver image is being developed on the negative paper. At the same time, the developer also dissolves some of the unexposed silver salts from the non-image areas of the negative emulsion. The dissolved silver salts diffuse to the receiving sheet where another chemical reaction creates a positive image. The negative and positive reactions take place rapidly and simultaneously—a few seconds after the sandwiched sheets emerge from the machine they can be peeled apart.

COST BREAKDOWN

METHOD	1st Print*	Additional Prints	Equipment †
DTR	8½¢	8½¢	$169 to $498 ††
THERMOFAX	5½¢	5½¢	$229 to $429
VERIFAX	9¾¢	¾¢	$99.50 to $395

* Based on manufacturer's list price for minimum quantity of supplies for 8½" x 11" prints. Does not include equipment depreciation factor, labor, chemicals, etc.

† Manufacturer's recommended equipment.
†† For combined printing and processing machines of leading suppliers.
Second to fifth prints from same matrix.

Negative and positive papers are available in standard stock sizes from 8½" x 11" to 14" x 17". Positive sheets come in letter, air mail and card weights as well as transparent paper and film (clear and matte). Many plant photographers use the transparent copies for overhead projection slides. Two-sided copies can be made by using duplex transfer paper. Offset duplicator plates can also be made directly by the DTR method on aluminum transfer plates marketed by A. B. Dick Co.

Each method has some distinct advantage which may be price, ability to make multiple copies, excellence of legibility, permanence, speed or versatility. Although all make acceptable copies, their visual appearance is vastly different. To help you determine the method that suits your needs best, take advantage of the personal demonstrations, on your premises, which most manufacturers offer. The cost is only a phone call. THE END

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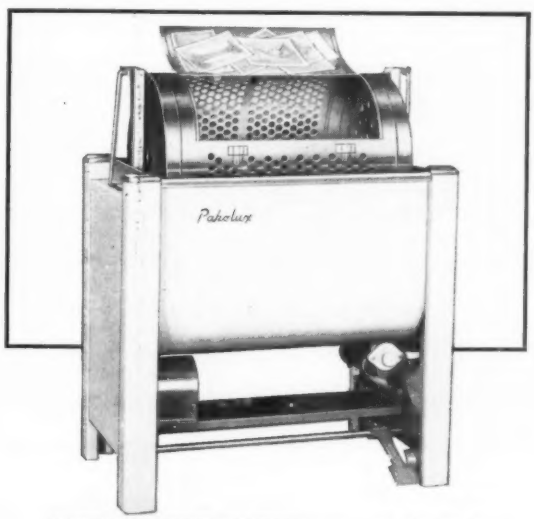

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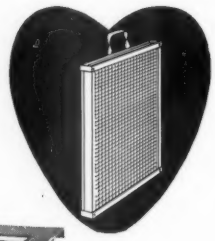

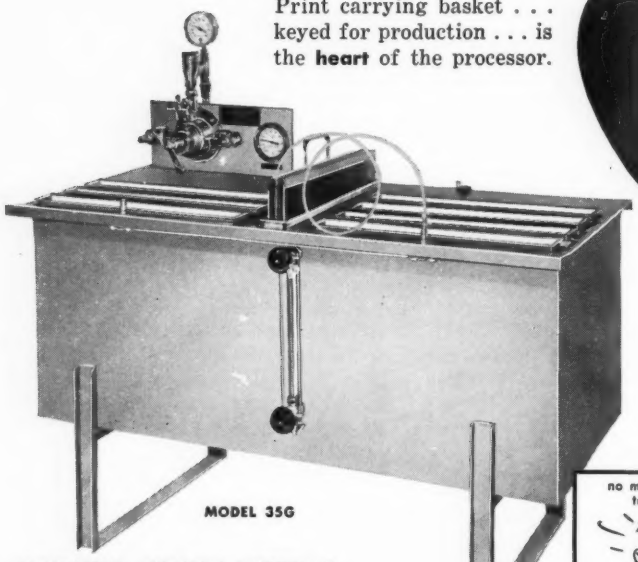

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PHOTO TECHNICAL BOOKSHELF

Microphotography: *Photography at Extreme Resolution, by G. W. W. Stevens. John Wiley & Sons, Inc., New York, 1957. 326 pages. $8.50*

Microphotography is the photographic process of making images so small that an enlarger or other optical device is usually needed to read the results. In its commercial application it is usually known as microfilming.

The objective of Mr. Stevens of the Kodak Research Laboratories, Wealdstone, Harrow, England, in writing this work has been to collect published information that seemed most important for the practice and application of microphotography. The book fulfills this objective.

Basically it is divided into sections on production techniques, followed by those on applications. There are chapters that describe sensitive materials, processing methods, objectives, focusing mechanisms, the camera and the original. These are followed by a chapter on microphotographic techniques, or the selection and use of these materials and methods to accomplish specific objectives. Another excellent chapter describes image formation and methods of control to insure extreme sharpness. Two chapters collate information on applications. One chapter is concerned with the technical problems of production and the design of reticles. These are the fine reference marks used in optical parts of measuring instruments that can be produced through microphotographic processes.

While the author makes no claim that this work is an exhaustive treatise on the subject, it does contain much useful information, aside from the text, in the illustrations and the tabular data. The volume is recommended as a useful reference for working professionals in the field.

Chester Lewis,
Chief Librarian,
The New York Times

AN EDITORIAL

OPPORTUNITY? ALWAYS

TO THEIR EVERLASTING credit, photographers in industry, government and science keep turning out superb and original photographs. And the credit is all theirs, because the quality of a photograph begins in the mind, eye and hands of the photographer—never in the requisition sheet.

Although an assignment can lead a photographer into a stimulating picture situation, it seldom happens in practice. Salvaging a few outstanding photographs from a run of humdrum but essential jobs is chancy at best.

A photographer for a Pennsylvania steel mill, faced with this difficulty, bargained with his employers to spend part of his time taking the pictures which to his sensitive eye were begging to be recorded—but which, in the press of daily business, would wait an eternity for specific assignments. Slowly, he gathered a file of pictures. They were spectacular—which should have surprised no one, because the man's ability is typical of American industrial photographers: excellent. But the pictures surprised everyone, including the photographer's boss. They filled half of a proud annual report, were sought by salesmen and the members of the company's speakers bureau, were used in numerous company publications, in advertisements and, as news, in local and national publications. His prestige rose as quickly as his value to the company.

You may be too rushed to try the same solution, but at least you can jot down ideas as they occur to you. When the pressure slackens, you can return to experiment with your own ideas, to examine your old habits to see if they force your pictures into a stereotype for no reason at all, to make the pictures *you* want to make. No need to worry about whether they apply. Good photography always applies.

The Editors

AERIAL PHOTOGRAPHY

For striking pictures from the air, imagination is more important than fancy equipment, says leading industrial photographer Charles E. Rotkin.

It takes a really bored, unimaginative photographer to make a dull picture from the air. The wealth of visual material flying reveals need not be reserved for big, big industry or the military. With fairly simple equipment and a little thought, any competent cameraman can make striking, useful photographs that have the dramatic advantage of altitude.

What about equipment? There is no pat answer. An oil pipeline company which patrols its own lines by air surely has greater use for aerial photography—and elaborate equipment—than a small firm, with what might be described as a local operation, but which might nevertheless occasionally need a picture of its plant site.

Let's start with the photographer who may be called upon to do a fair amount of aerial work. His equipment should be constructed solidly and have an accurate shutter and a critically sharp, fixed focus lens. It should be easy to load, and it should have a dependable film transport system. The film should handle easily in the darkroom.

What's wrong with the K-20

After the war the military dumped a large number of surplus aerial cameras on the market. The

so-called prize of the lot was the K-20 of Air Force fame. It soon became apparent that this camera was anything but a bargain for the average industrial photographer. Finding that his K-20 had a 6¾-in. focal length lens, the photographer was anxious to try it out. He took off to discover that, because his plant is in a congested industrial area, the law forbids the pilot to fly lower than 1,500 feet. At this altitude the images are so small and the angle of view so broad (over 40 degrees) that the scene was flat-looking and his proud plant minuscule.

The K-20 takes some 50 exposures on a 20-ft. roll of film that requires special developing equipment, gallons of developer, special drying, contact printing and enlarging equipment. Without this special equipment most of the film winds up on the darkroom floor.

Disgusted, the photographer said, "It's spinach and the hell with it!" He grabbed his old reliable Speed Graphic, put a 12-in. lens on it and went aloft again. This time he found himself faced with the tasks of trying to shoot pictures, insert and remove dark slides, store jouncing film holders, cock shutters with heavy gloves, ad nauseam. The Plexiglas of the plane was dirty and scratched so he persuaded the pilot to remove one of the windows. The photographer poked the Graphic into the slipstream. But he forgot he was doing over 70 miles per hour—the camera was almost torn from his hands. Then a pathetic expression covered his face as the bellows jerked off the lens standard.

Rigidity and focal length

The sad tale above is unfortunately very much to the point. Rigidity of the camera and focal length of the lens are a primary consideration. Since aerial cameras do not require focusing, they are usually constructed with a solid metal cone which can stand high windstreams and occasional jouncing and bouncing in rough air. The aerial camera usually has a heavy handle which can be gripped strongly, and the controls are such that they can be operated with the heavy gloves frequently needed to protect the aerial photographer's hands against freezing or subfreezing weather.

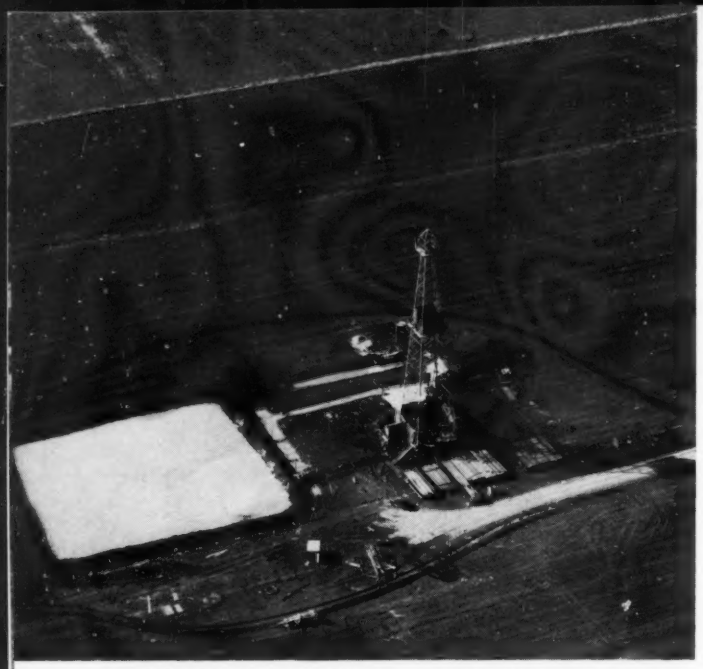
To meet these requirements, some years ago I reconstructed two cameras to fill my own special needs on flying assignments.

FOR ESSO, ROTKIN shot last of the roundhouses with modified Navy F8. Used only with steam engines, roundhouses disappear as lines convert to diesel.

HELICOPTER MADE work easier for Rotkin by hovering steadily over blast furnace and ore piles of Fairless Works of U.S. Steel. Job was for *Life* magazine.

SIX WAYS TO BETTER AERIALS

1. Use rugged, rigid equipment. Slipstream can tear the bellows off a camera.
2. Use 4x5 where possible. Semi-automatic motor driven 35mm cameras are handy once in a while, but quality may suffer in enlargements.
3. Use medium speed, medium contrast film. High speed materials, seldom essential, are apt to lack brilliance.
4. Use a K2 filter to cut down aerial haze—in black-and-white work only, of course!
5. Use a fast shutter speed to minimize vibration when shooting from a helicopter
6. Use your imagination. Learn to see the pictures you fly over.



OKLAHOMA OIL WELL on farmland, shot from a Luscombe Pipeline Patrol plane for Esso. Dike protects farm from contamination.

AERIAL PHOTOGRAPHY *(continued)*

The first camera used was a Navy surplus F-8. I removed the original 5 x 7 roll film mechanism, and substituted a standard Graflex 4 x 5 back. This permitted me to use the then standard Graflex film magazines loaded with sheet film. The focal plane shutter, a self-capping type which eliminates the need to reinsert the dark slide before winding, is extremely accurate. In fact, after ten years of constant use, I find the shutter is still within five percent of original accuracy. The large, heavy shutter gear train doesn't clog in cold weather. Since the camera came with a 15-in. telephoto lens which I didn't use, I removed it and substituted a 10-in. Eastman Commercial Ektar f/6.3 which is remarkably sharp.

However, this lens was too slow for pictures made with Kodachrome, the only sheet transparency color film available at the time. Therefore, I put a war-surplus 7-in. Aero Ektar f/2.8 on the second camera. While not as sharp as the Commercial Ektar, the Aero Ektar was adequate when stopped down to f/3.5. True, the focal length was shorter than desired but at that time I had little choice in the matter. With the increased speed of Ektachrome and finally now with the fast Anscochromes, I have eliminated the Aero Ektar and substituted a 240mm Schneider Xenar f/4.5 which is more than adequate for the present high speed color films. Although the old style Graflex magazines are no longer produced, there are lots of them in used camera shops. The most badly abused magazine can be rebuilt at reasonable cost. Or, the newer 6-septum holders can be used instead with the proper back.

Using the Speed Graphic

For the photographer who only occasionally has to make an aerial photograph, the old reliable Speed Graphic can be used with certain adaptations. First a metal bracket should be made to brace the front lens standard rigidly. This can be improved further by making a set of aluminum windshields for the bellows. The front shutter should be locked open and the levers and stops taped to prevent changes of position by the wind. Then the rear shutter is used for shooting. By using a 2¼ x 3¼ Graflex roll film back you automatically increase your image size in relation to your film size. By substituting a 7- or an 8-in. lens you get an even larger image.

One camera which I have found to be very useful as an aerial camera is the Hasselblad, that superb Swedish camera with interchangeable lenses and backs. When used with its sports finder and rotated 90 degrees so that the finder comes up on the top of the camera, it becomes a quick-working rigid aerial camera. On a recent trip, I took an assistant along with me in a three place plane. While I shot with one magazine on the camera, the assistant kept reloading the spares so I had a constant supply of both color and black-and-white at my fingertips. One criticism of the Hasselblad as an aerial camera is its somewhat delicate construction; great care must be taken to protect it from rough handling. Although I have not yet been able to test them, the Simmon Omega and Linhof 23 look inviting as aerial cameras.

The simplest camera to use effectively in the air is the 35mm. The flexibility of this camera with its wide choice of lenses makes it ideal for occasional aerial use. Since the negative size is small, however, extreme blow-ups leave much to be desired. This summer on an assignment for *Life* in Switzerland I used a 35mm extensively because the air was so rough that it was impossible to handle the larger aerial cameras in the tight quarters in which we were working. The recent rash of automatic and semi-automatic motor-driven 35mm cameras—such as the Leica, Nikon, Praktina and Foton—is an interesting improvement for the photographer who has to make a series of pictures and is restricted to a single run over the scene.

When equipped with longer lenses, it is difficult to use the eye-level finder on 35mm cameras because the image is dreadfully small. It is almost impossible to use properly the reflex type finder on a 35mm equipped with extra long focal length

lenses, since there isn't much time for targeting aloft. Instead of struggling with conventional finders I have rigged a rifle type peep sight, which I find a must with long lenses.

What films or filters?

As far as films and filters go, there are no special problems. For black-and-white pictures I use medium speed, medium contrast panchromatic film with a K2 filter. The superspeed panchromatic films should be avoided because their lack of contrast is deadly in hazy or flat lighting. Originally when I was shooting Kodachrome and Ektachrome through the f/2.5 Aero Ektar, I had special filters made up in a variety of grades: Kodachrome Haze, Skylight, CC 13, 14 and 15 (plus some A filters for infrared film). With Ektachrome, I pretty well standardized on the Skylight filter though occasionally this left something to be desired. With Anscochrome I worked without a filter at all, finding that the natural warmth of the film compensated to some degree for the coolness of the light diffused from blue sky. When I switched to the 240mm Schneider I ordered a number of blank B glass filter disks, and made a variety of gelatin sandwiches which covered most of the recommended filters.

Aircraft and aeronautical problems

For the average industrial photographer these are not complicated factors. Almost any standard single-engine high-wing plane can be used. The ideal aircraft for this type of work are the Pipers that range from the two place Cub with an excellent transom type door *(continued on page 46)*

BACKLIGHTING CREATES THE MOOD for this dusk view of a string of oil barges and its towboat, on the Mississippi north of Baton Rouge, La. All pictures for this article were made with a converted Navy F8 aerial camera, using Super Panchro-Press, Type B and a K2 filter. Usual exposure, 1/400 at f/8. The aircraft used for this shot was a Piper Super Cruiser.

PMI's Monthly

READERS' SHOWCASE

You are invited to send in your pictures for this feature. See details below.

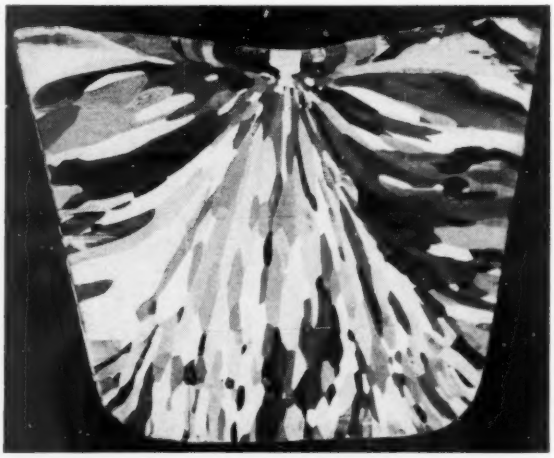
The question before your camera is a constant one: How can I add imagination to my assignment? On these pages, five answers are given to five widely varying picture problems by as many photographers.

Terry Thurn of Chrysler found his answer in the darkroom. Free-lance Bernie Cleff used imaginative and *appropriate* props to add punch to an otherwise dull publicity "mug" shot. DuPont's Alexander Henderson chose a middle of the night decisive moment. Morris Gordon, of Western Electric, came in close on a large piece of machinery, kept the human element in mind. Kaiser's Leslie C. Fore found graphic beauty in a one-to-one close-up.

What's been your most imaginative pictorial answer to a run-of-the-mill assignment?

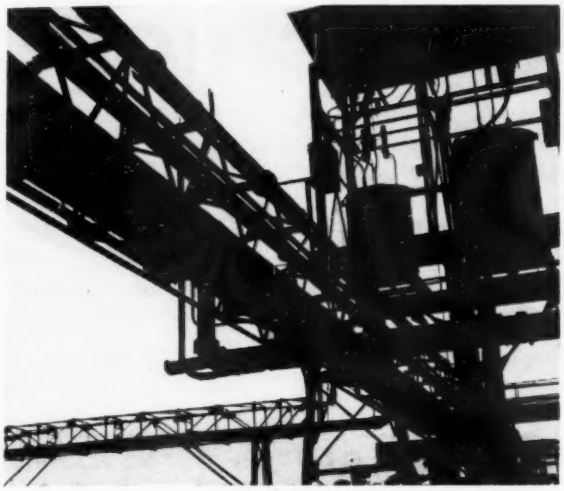
You, as a reader, are cordially invited to send in your pictures. There are two rewards for each of the ones chosen. The first is knowing that your picture will be seen by appreciative fellow professionals. The second is $10.00. Please include your name and your company's name, a note about the picture and how it was used, and the technical data. Send them to SHOWCASE, PMI, 33 W. 60, New York 23, N. Y.

BERNIE CLEFF used existing light from fluorescent ceiling fixtures, stepped up with three No. 2 photofloods bounced from walls and ceiling, to make this relaxed publicity portrait of Lawrence Emley, president of the Kiwi Co., Philadelphia, Pa. Cleff put his Rolleiflex on a tripod, shot at 1/15 sec. at f/6.3 on Tri-X film. He developed film in Promicrol.



LESLIE C. FORE, Kaiser Aluminum & Chemical Corporation, Spokane, Wash., pictured the grain formation that pure aluminum assumes when cooled. Etching the metal revealed pattern. Fore shot the one-to-one close-up with an 8 x 10 Eastman View 2D and a single flood lamp.

TERRY THURN, a member of the photographic department of Chrysler Corp., Detroit, Mich., took the photograph, *below*, on a dull gray day. He used a Rolleiflex loaded with Tri-X film. Exposure was f/11, 1/200 sec. Thurn flopped the negative for better composition, dropped out middle tones by printing on a contrasty paper.



ALEXANDER G. HENDERSON, staff photographer for the DuPont external publication *Better Living*, Wilmington, Del., made this shot in a railroad terminal at midnight to demonstrate the theme of "work around the clock." He relied on existing yard lights and the engine's headlamp for illumination. Camera was f/3.5 Rolleiflex. Exposure: one sec. at f/5.6 on tripod, Tri-X film.

MORRIS GORDON, Western Electric Company, New York City, made this strikingly well-designed photograph of a man laying cable in a cylindrical drying kiln at the Western Electric Point Breeze Plant in Baltimore, Md. He used a 4 x 5 Linhof with a 6-inch Schneider Xenar lens. Illumination was by existing light and the exposure was f/5.6, 1/25 sec. on Super Panchro-Press Type B film.

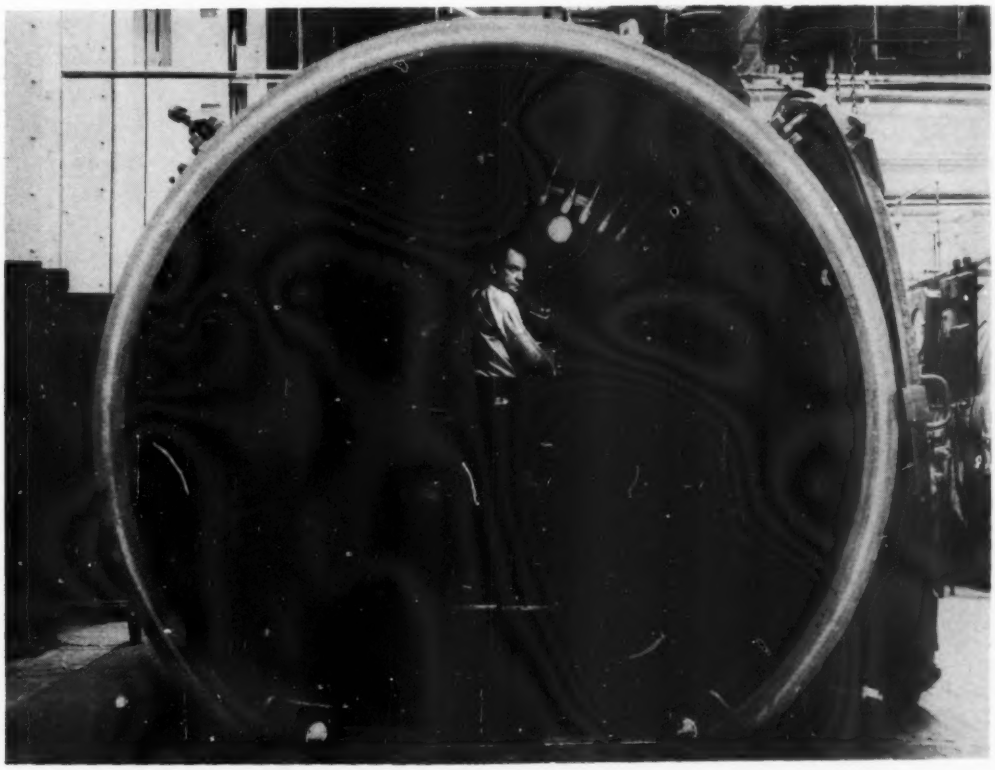
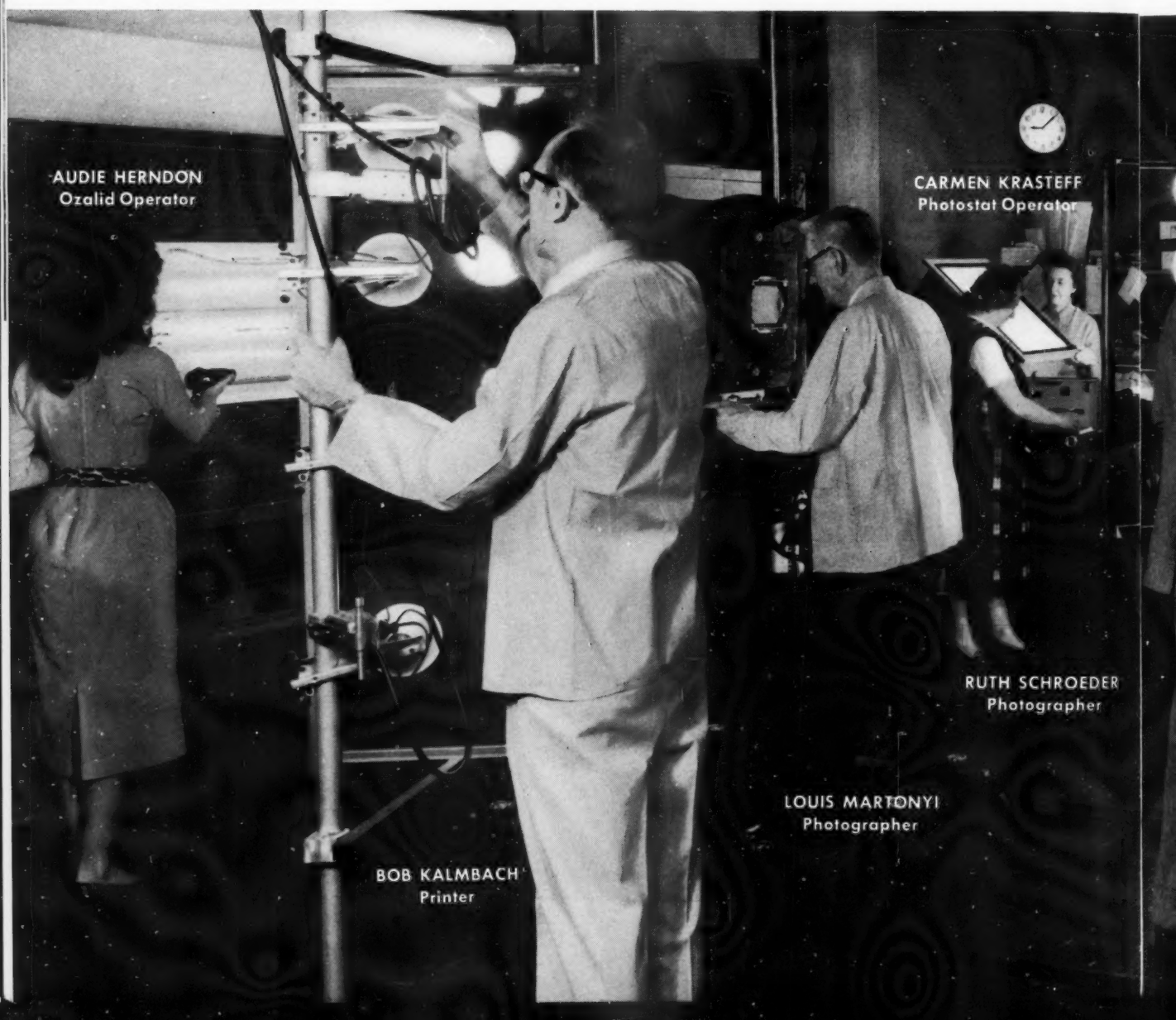


PHOTO DEPARTMENT ANALYSIS NO. 2

UNIVERSITY OF MICHIGAN

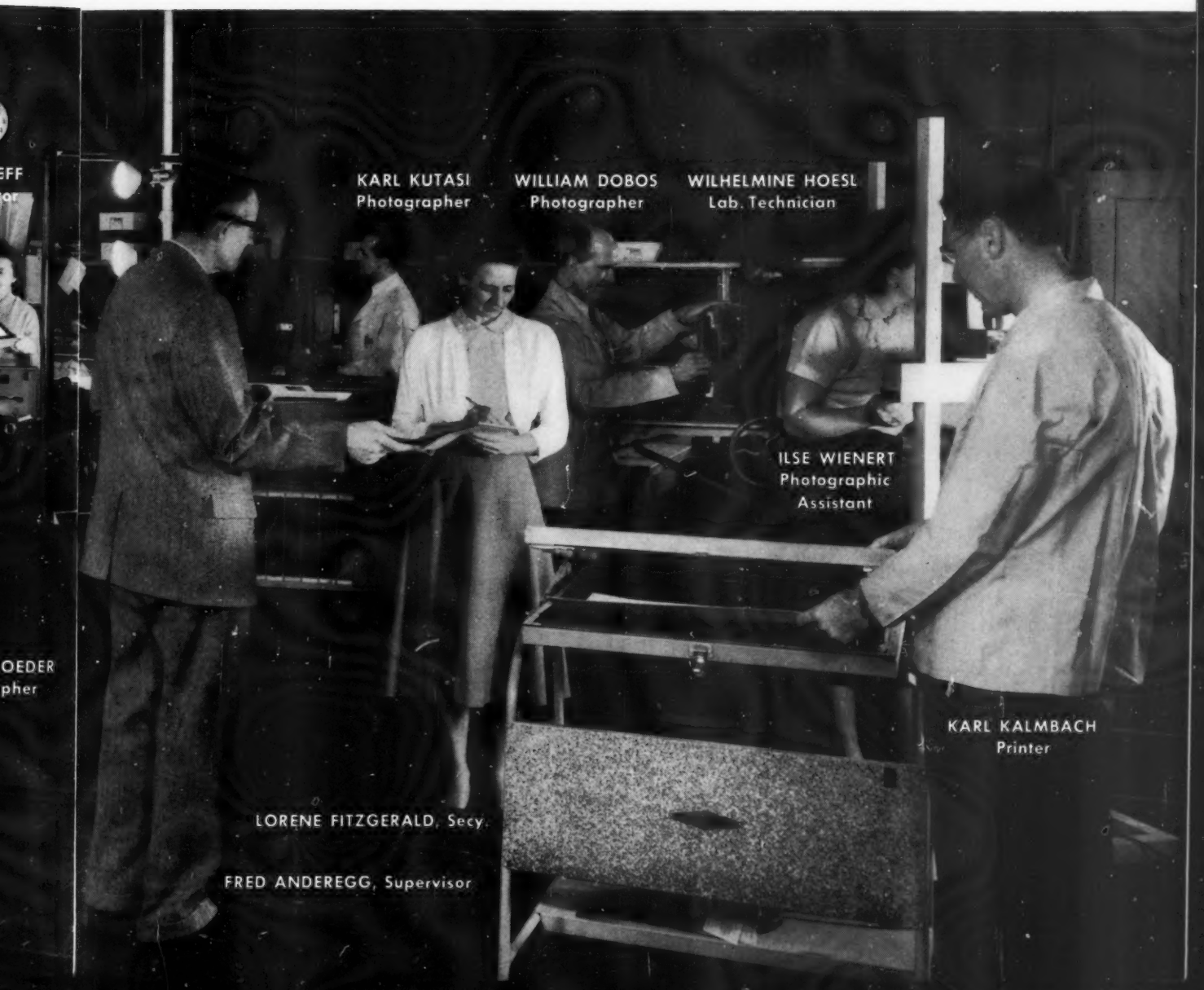
How a staff of 12 turn out 20,000 black-and-white photographs, 1,000 color slides, 98,000 black-and-white prints, 276,000 Ozalid prints and 98,000 photostats per year. Here's their setup to do it.



The Photographic Services Unit at the University of Michigan, Ann Arbor, under the supervision of Fred Anderegg, serves all campus department and University personnel. Work is extremely varied in scope. Among other things the Unit makes photographs of fossils, photomicrographs, photoduplicates of transcripts and grades, takes identification photos for the whole student body, reproduces maps and textbook illustrations, shoots groups of visiting dignitaries, records the progress of buildings such as the atomic reactor under construction. The Unit does its own color processing, slide duplicating and color printing. There is no negative file. All negatives are delivered to the customer with the finished work.

For the fiscal year 1956-1957, the Unit took 20,868 black-and-white pictures, 1,061 color transparencies. They processed 98,713 black-and-white prints, 1,061 color prints, 276,375 Ozalid prints and 98,893 photostats. The Unit bills each department and individual on a monthly basis.

The L-shaped floor space in the basement of the University's Administration Building, allotted to the Unit, totals somewhat over 3000 square feet. The vertical part of the "L" is devoted to photography, while the tail end houses the photoduplicating equipment. The photo-duplicating department, which takes up about 1000 square feet, contains a No. 4 Continuous Photostat machine, a Printmaster Ozalid machine, a large laminating



machine, storage space for paper and various chemicals and space for one girl to receive and give out work. The photography end of the Unit is divided roughly into three main parts: 1. the shooting room, 2. the darkrooms, 3. the print finishing office, lantern slide binding room and repair shop layout.

In the camera room, in almost constant operation, are two old 11 x 14 view cameras and an 11 x 14 Deardorff studio on an 8-ft. stand. (Anderegg would have preferred a 12-ft. or 15-ft. stand on the Deardorff, but was limited by the 9-ft. high ceiling.)

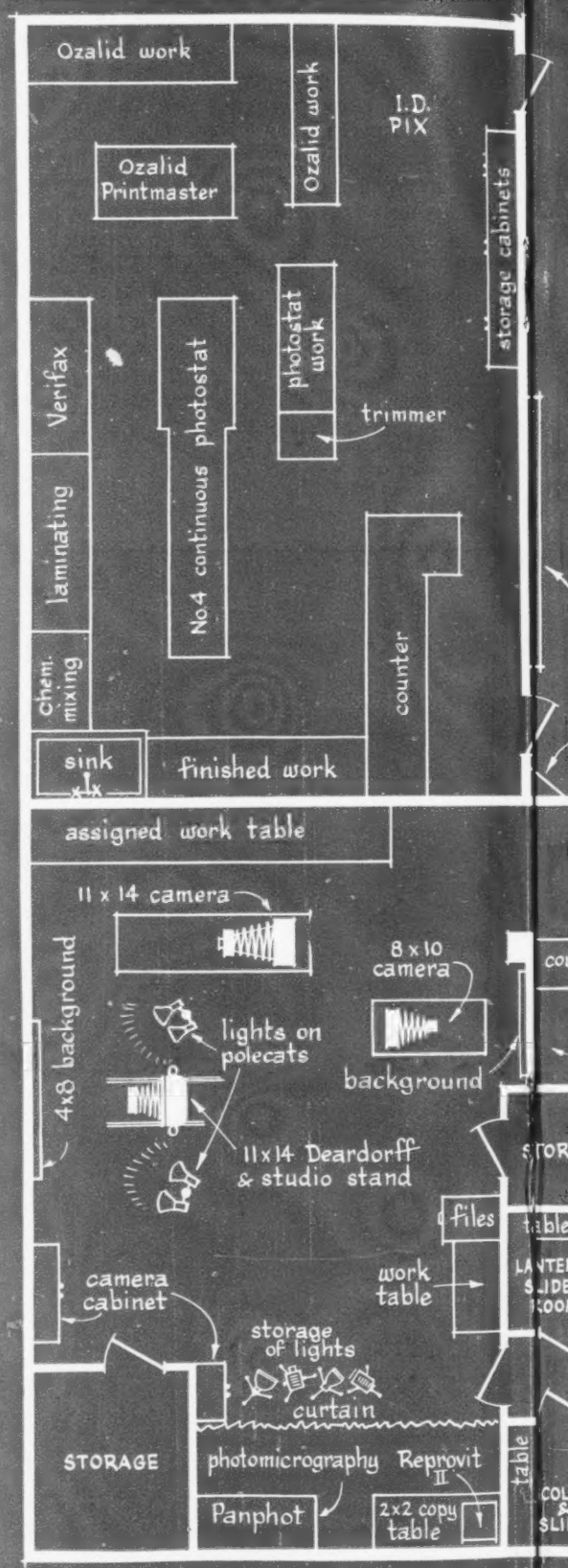
In the shooting room, behind a black curtain which can be drawn, are two special cameras. One is the Leitz Panphot photomicrographic camera and the other, a Leitz Reprovit II device on a sturdy table with permanent lights. Speaking of lights, Anderegg has made Hi-Lo switches for almost all the lights (see picture, *page 32* and diagram, *page 53*). He is a great believer in focusing at 55 volts and turning up to full voltage only when shooting.

The Panphot camera is extremely versatile. When a biologist comes in with a thin section of some tissue, the staff can photograph it; if the next customer is a geologist with a thin section of a rock requiring polarized light, he can also be accommodated. He may have some polished sections of rock, which require totally different techniques. With the Panphot photomicrographic camera the operator can change quickly from transmitted to reflected light; with a couple of body changes he can go from photographing thin to polished sections within one minute.

Other equipment

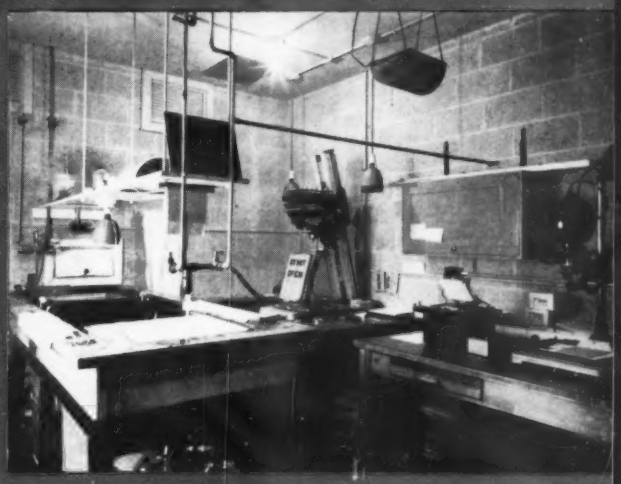
Beside the 11 x 14 studio and special cameras, the staff has eight Leicas, a number of 2¼ x 2¼ reflexes, including Rolleiflexes, six 4 x 5 Speed Graphics, a 5 x 7 Linhof, a 5 x 7 Sinar, an 8 x 10 Deardorff, an 8 x 10 Eastman View, a Maurer 16mm movie camera (complete with four 400-ft. magazines, a wild and a sync motor and five lenses), a Cine Special with three lenses, a Bell & Howell and a Bolex, each with four lenses.

Although they have a very complete store of cameras, only a few are used solely by the Unit itself. The Unit rents out cameras (the movie equipment is almost exclusively for rental since Anderegg does no movie work for the University) for the day, or the week or the month. Cameras go all over the world—South America, Japan, the Middle East. This unique rental system is almost a necessity. A University scientist may have an

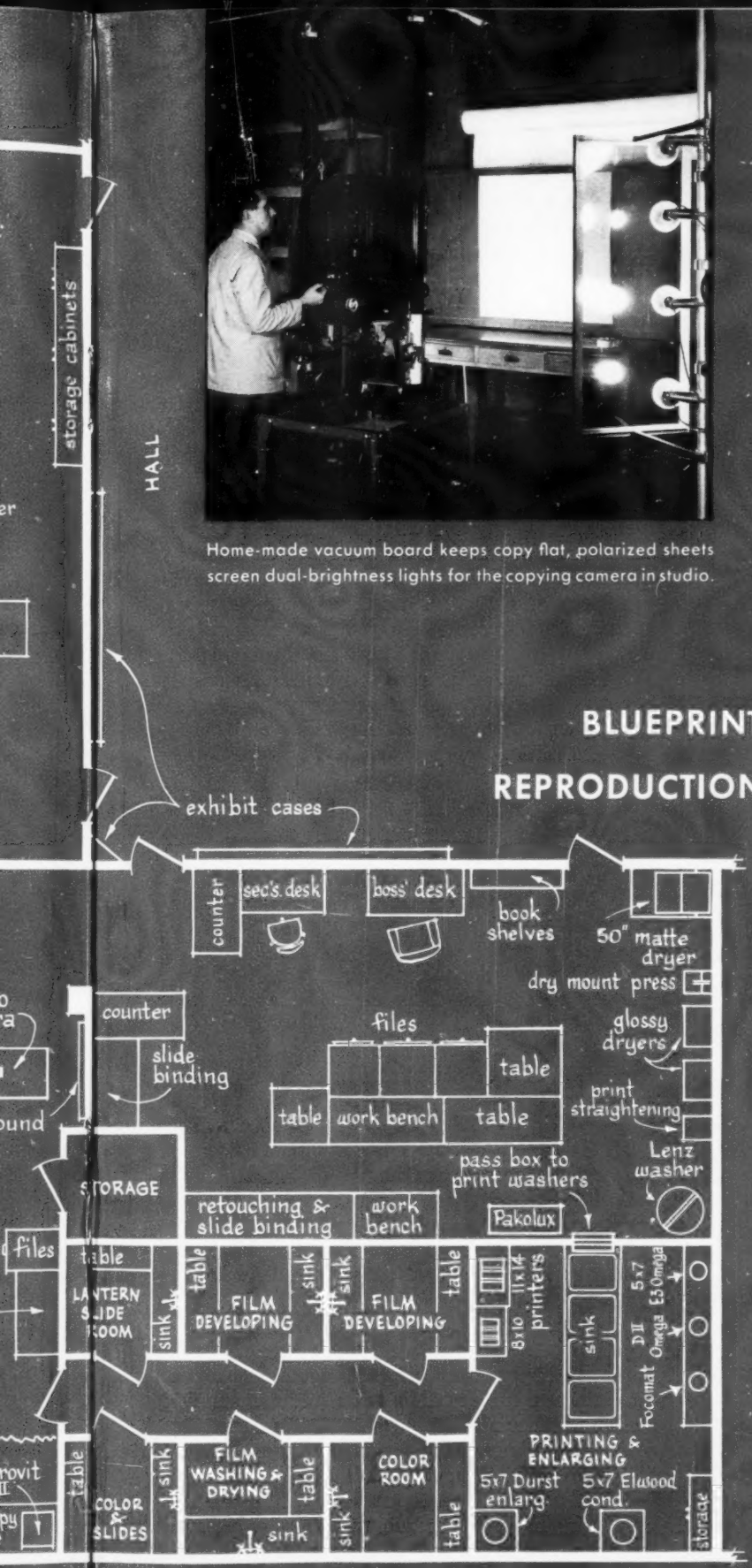


Home-made vacuum board keeps copy flat, polarized sheets screen dual-brightness lights for the copying camera in studio.

Print room has enlargers, contact printer near walls with common central sinks for processing solutions.



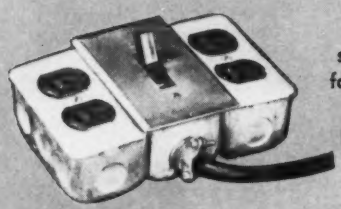
BLUEPRINT: COMPLETE PHOTO AND REPRODUCTION DEPT. IN LIMITED SPACE



University of Michigan Photographic Services Unit has total floor area of over 3,000 square feet. The vertical part of the L-shaped floor area is about 1,000 square feet, holds all the photo duplicating machinery. Photography end of the unit is divided roughly into three main sections: 1. Shooting room; 2. Darkrooms; 3. Print finishing, office, transparency slide binding, repair shop. The small darkrooms were designed for one-man operation. All water is run through thermostat units. Wherever water is used for washing purposes, it is filtered. A constant voltage transformer takes care of all voltage fluctuations.

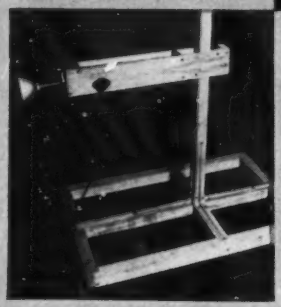
YOU CAN BUILD MOST OF THESE GADGETS WHICH SAVE TIME AT THE UNIVERSITY.

An 11 x 14 Pako ► printer operates on about 20 Argon bulbs. By wiring the unit carefully, constructing a control box, Anderegg can dodge contact prints, turning off individual bulbs when necessary or dodge in circular patterns to remove the dark edges in aerial photos.



◄ Why burn your expensive floods and spots while lighting and focusing? You can easily make this Hi-Lo switch permitting operation at 55 volts or 110 volts. See list of materials plus wiring diagram on page 59.

Light boxes are ► necessary, but they're in the way when not being used. Anderegg found old disappearing typewriter tables, fastened light box where typewriters normally go. Desks offer flat working surfaces; light boxes can be uncovered instantly.



◄ Homemade light bars with built-in reflector floods travel vertically on square wooden uprights. Arm with light at end acts as weighted lever, can be moved freely up or down. Wedges in arm hold it in place against upright at any height.

Open books are hard ► to hold flat for copying. Place 10-in. thick foam rubber mattress in 10-in. deep box with hinged glass cover. Put book atop foam rubber. Close hinged cover and pages will be flat against glass.

PHOTO DEPARTMENT ANALYSIS *(Continued)*

experiment which he must record. Perhaps something is happening under a microscope. He must shoot it himself since it can happen almost any time during the day or night and he can't call in a photographer. He doesn't want to buy a camera just to shoot a few experiments so he rents one.

Cameras are rented out for less lofty purposes also. Students rent equipment to take pictures of student activities. During the football season telephoto lenses are much in demand for rental. Rental prices are reasonable. If the Unit can pay for the camera in five or ten years and pay for the repairs, Anderegg is quite satisfied. A short course in photography is given to each person renting a piece of equipment. He has to be checked out in the use of the camera, the exposure meters, etc.

The Unit does not do photofinishing per se. But while no "snapshot" rolls are developed for the general public or even for University people, customers are asked to turn film over to the staff for developing when it pertains to University activity such as field work or doctoral dissertations.

One-man processing rooms

The Unit has six small and one large processing rooms. The small film developing rooms were made for one-man operation. The processor can stand in the middle of the room, turn to one side and have the loading table there in front of him. Turning around he can take a half step and be at the sink. The tables were purposely designed without sharp corners. They're covered with a mottled grey linoleum surface so that either black sheets of film or white sheets of paper can be easily seen. This linoleum is curved around corners so that it can be quickly wiped free of dust. All sinks but one are soapstone. (A lot of thought went into deciding whether the sinks should be of soapstone, cement, wood or stainless steel. Anderegg decided on soapstone and says he has never regretted the decision. An experimental Fiberglas sink has stood up very well under use for two years. If the lab is enlarged, there will be more Fiberglas sinks.)

One of the six small darkrooms was originally a film loading room. Space was needed so it was made into a lantern slide room without running water. Another room was a chemical mixing room which within one year had to be converted into a film developing room. Another one of the rooms is slightly larger and is used as a film washing room. The largest darkroom, with the sink protruding into the middle of the room so it can be worked at from both (*continued on page* 53)

by Bernard Hoffman

QUESTION & ANSWER

QUESTOIN: I have to take a picture of a huge factory room. There's enough motion in the scene so that I must shoot at 1/25 sec. or faster. I think about 20 No. 40 flashbulbs will cover the area. How can I make sure they'll go off in sync?

ANSWER: Twenty No. 40 flashbulbs represent a fair investment—so it would probably be wise to make sure, first, that all the bulbs will go off. Here's one way to do it. Connect them in series, like the old-fashioned Christmas tree lights. Thus if one flashbulb ignites, you know that they've all gone off simultaneously. Test each flashbulb (you can get an inexpensive flashbulb tester at any photo store—it's a good investment) before putting it in place.

For a series connection such as this you'll need house current voltage, 110 to 120V. Since house current is grounded, it might be dangerous to use flash extension equipment. Therefore, I'd recommend standard screw-in type outlets such as you'd use for photofloods.

The duration of the No. 40 flashbulb at half peak is less than 1/50 sec., so it should stop the motion to which you refer even when you use open flash. However, if there is a high level of existing light in the room which might result in motion blur, you can use synchronization with such a circuit and shoot as fast as 1/25 sec. Here's how: Obtain a small relay (such as the Potter and Brumfield relay type RS-5D, available from most electronic suppliers for about $2.50). Use a flash gun with a B-C unit or four photoflash batteries and M-delay synchronization. Hook up the flashgun to the shutter just as you would normally. Wire the extension flash outlet to the relay, and have the relay close the circuit on your string of lights.

QUESTION: My fingernails have developed stains on them which are impossible to remove. I say impossible because I've tried everything I know of. Is there anything which will take the stain off?

ANSWER: There is no reason to let a stain develop on your fingers or fingernails to begin with. If you must dip your fingers in developer, use one of many good, standard anti-staining fixers on the market; Hunt's Graph-O-Stat No. 3 is one of them. After a few days of use you'll notice a lightening of the stained areas. After a couple of weeks of use, all staining will disappear. Professional printers can have lily white hands these days. To eliminate staining your hands as a result of film processing, rinse your hands thoroughly of all developer before touching the fixer. I know of nothing which will successfully remove stain in one shot—except, maybe, a fire axe.

QUESTION: I use an 8 x 10 contact frame for multi-proofing negatives. It works fine except that I'm eternally getting dust spots on the prints.

ANSWER: You're not alone. Nearly everyone gets a white dust speck or two on contact prints made by this method. But since it's proofs you're making, this slight imperfection shouldn't be a great bother. If you have an 8 x 10 enlarger, you might be better off doing your "gang" proofing by projection printing. Optical printing reduces the possibility of dust showing. Furthermore, you can slightly enlarge negatives made by this method and thus make tiny ones easier to see.

QUESTION: Is nitrogen agitation any good? What equipment do you need for it?

ANSWER: Nitrogen burst agitation is one of many good means of mechanical agitation for processing. The basic equipment consists of a tank of nitrogen under pressure, a metering valve and a pipe to the processing solution. When nitrogen is released in the tank, its bubbles rise to the top of the solution, where they are released in the air. Nitrogen is non-toxic (four-fifths of the air is nitrogen, as you probably recall) and is practically inert, so it has little effect on the solutions themselves. The bubbles produce a moderate and even agitation. They also help to equalize the temperature difference likely to exist between the top and the bottom of large tanks.

QUESTION: I have to make a color movie in a plant during the daytime. There is light coming through the windows, but not enough for proper exposure. How can I balance the color temperatures of my artificial and existing light? Are there any blue photofloods for this?

ANSWER: There are blue photofloods, but they are not balanced for daylight. Studios use arc lights or heavy blue filters for tungsten light. The filters absorb a great deal of light. You could use large sheets of amber gelatin (available from motion picture supply houses) over the windows and shoot with tungsten film—or simply shoot with tungsten film and allow the sunlight to show a blue cast.

QUESTION: I get reflections on my copies despite the fact that I follow the rule of placing my lights 45 degrees from the center of my copy. What's wrong?

ANSWER: The rule is no rule at all. The law of reflection states that the angle of incidence is equal to the angle of reflection. While the rule of placing the lights at 45 degree angles to the center of the copy works out in some cases, it is possible at this angle for the copying light to reflect directly into the lens. You can test for reflections by sliding a small mirror over the material to be copied, while looking for reflections of the light at the lens position. Sometimes you'll have to adjust your lights to an angle much smaller than 45 degrees. The center of the beam of each copying light, by the way, should be directed at the opposite edge of the copy so that the illumination is even throughout.

What's your technical problem? Ask Bernie Hoffman. It's simple, just write: Questions Editor, PMI, 33 W. 60, New York 23, N. Y.

You'll Probably find the Camera You need on this Chart of Industrial

PROFESSIONAL MOTION

Camera	Type of Drive	Frames per Second Shutter Type	Film Capacity
ARRIFLEX 16	8-volt variable speed motor operates either on rechargeable battery pack, dry cell batteries, or 110-120-volt AC with transformer-rectifier.	0 to 50 fps shown on tachometer coupled to film drive. Tachometer works for all Arri motors (see special features). 180° shutter operates at 1/50 sec. exposure at 24 fps.	100-ft. daylight loads (see special features).
AURICON CINE-VOICE	115-volt 60-cycle constant speed motor for camera operates on either AC current or on 12-volt battery with rotary converter. Sound recording system works on batteries.	24 fps only. Has 173° shutter which operates at 1/50 sec. exposure.	100 ft. daylight spool.
BELL & HOWELL 70-DR	Ratchet wound spring motor has 23 ft. run per wind. Can also be hand-cranked.	8, 12, 16, 24, 32, 48 and 64 fps. 204° shutter gives 1/50 sec. exposure at 24 fps.	100 ft. daylight load (see special features).
BOLEX H-16 REFLEX	Spring motor has 16 ft. run on one winding.	8, 16, 24, 32 and 64 fps and single frame. 143° shutter gives 1/60 sec. exposure at 24 fps.	100 ft. daylight loads.
KODAK K-100	Spring motor has 40 ft. run on one wind. Can also be hand-cranked.	16, 24, 32, 48 and 64 fps. 165° shutter gives 1/50 sec. exposure at 24 fps.	100 ft. daylight loads.
CINE-KODAK SPECIAL II	Spring motor has 38 ft. run on one wind. Can also be hand-cranked.	8, 16, 24, 32, and 64 fps and single frame. 165° variable shutter (see special features) gives exposure of 1/52 sec. at 24 fps.	100 and 200 ft. capacity interchangeable film chambers.
MAURER 16	Variable speed, synchronous, and stop motion motors available.	2 to 72 fps, depending on motor. 235° variable shutter gives 1/35 sec. exposure at 24 fps.	400 and 1200-ft. magazines available.
MITCHELL 16	Electric motors sold separately and range from synchronous to variable speed and stop motion.	Depends on motor—speeds range from stop motion to 128 fps. 235° variable shutter gives 1/35 sec. exposure at 24 fps.	Either 400 or 1200 ft. darkroom loading film magazines available.

ON PICTURE CAMERAS

pacity	Focusing, Viewing Systems	Lens Mount	Special Features and Notes
loads (see).	Through-the-lens mirror reflex focusing and viewing even while camera is running. Has 10X magnification of image. Adjustable eyepiece permits viewing without glasses.	Three-lens divergent turret allows combination of extreme wide-angle 11.5mm, and 300mm telephoto without optical or mechanical interference. Lens mount is bayonet-type.	Weighs about 6½ lbs. with three lenses. Long film gate, 2½ in. for precise film alignment, and registration pin, independent of film transport claw, keep film flat and steady during exposure. Footage and frame counters work in forward and reverse filming. Quickly interchangeable synchronous motor, governor-controlled motor and animation and time-lapse mechanism available. Accessory 400-ft. external film magazine, sound blimp.
spool.	Manual focusing with lens footage scale. Finder covers 15mm wide-angle field and accepts mattes to indicate other lens fields. Has parallax adjustment.	Single lens camera for C-mounted lenses. Can be converted to three-lens turret.	Auricon is blimped to record optical sound and picture on the same film. Auricon Pro-600 and Super-1200 have up to 600 and 1200 ft. film capacities, respectively. The 600 has zoom lens door, synchronous motor drive, intermittent pull down, and can be converted to three-lens turret. The 1200 has a three-lens turret, synchronous motor, through-the-lens focusing, two finders, ball-bearing gate and variable shutter. Filmagnetic for magnetic sound available.
load (see	Focusing can be done either manually on the lens footage scale or through-the-lens with critical focuser magnifying eyepiece on right side of camera. Viewfinder is positive type—with front elements matched to each lens and mounted on viewer turret geared to lens turret.	Three-lens turret accepts C-mounted lenses. Special short barrel tele lenses available for B&H prevent mechanical or optical interference.	Weighs about 7 lbs. with three lenses. Has backwind for special effects like dissolves, double exposures. Accessories available include large spring wind crank, universal and synchronous electric motors, 400-ft. magazine (must be fitted at factory), single frame device, sports finder for 1, 2, 3, and 4-in. lenses. 70-HR is 70-DR with 40 ft. magazines and electric motor.
oads.	Prism reflex through-the-lens focusing and viewing, and detachable Octameter viewfinder with parallax correction.	Three-lens turret model with C-mount. Reflex model requires Bolex RX lenses for accurate focal distance positioning with some focal lengths.	Automatic film threading, frame counter, backwind, motor lock, time exposure, accessory 8 to 32 fps electric motor for AC or battery operation, behind-lens filter slot. Register claw for accurate frame positioning. Other Bolex models without reflex viewing system. Variable shutter and 400 ft. magazine may be added. However, any internal alterations made outside Bolex repair shops automatically terminates camera guarantee.
oads.	Manual focusing on lens footage scale. Viewing through matched 1:1 finders. Parallax markings inside finder.	One and three lens turret models are C-mounted.	Single lens model can be converted to turret model. Has crank for forward and backwind, single frame, viewfinder adjustable to individual eye, footage counter and counter showing remaining motor wind run. Turret model weighs about 7¼ lbs., with three lenses. Electric motors available and camera can be converted to 400 ft. magazine.
capacity lm cham-	Full frame reflex finder for focusing through the lens. Mirror automatically moves out of way when filming. The eye-level viewfinder has clip-on front frames for each focal length. Rear finder has parallax correction.	Twin-lens divergent turret accepting lenses with Kodak Type S mounts. Combination of wide-angle and 152mm tele without mechanical or optical interference.	Variable shutter for fades and dissolves or for increased shutter speeds at all fps as high as 1/560 sec. at 64 fps. 8 frame per turn shaft for advancing or backwinding film. Single frame per turn shaft for single frame effects, in addition to single frame release. Footage and frame counters. Accessory reflex finder image magnifier, optical finder, sports finder, accessory film chamber, electric motor, sound blimp, time lapse outfit.
agazines	Rackover for framing and focusing with three objective lenses, one for 15 or 20mm wide-angle, second for other lenses, and third for 140X magnification of image center. Viewing is through erect finder with 2¼ x 3-in. image.	Three-lens turret for C-mounted lenses.	Intermittent movement for film registration. Claw moves in a rectangle rather than an arc. Two spring buttons position film laterally. Automatic parallax correction. One knob moves wires in finder for field masking. Knob adjustment provides 40 or 60 frame fade. Camera works for either forward or reverse filming, for trick effects, dissolves. Anti-buckle switch.
200 ft. film le.	Rackover provides through-the-lens focusing and framing. Viewing is with external finder.	Four-lens turret with special Mitchell mount (flange with three screws) for lenses from 15mm up. Adapters available for C-mounted lenses.	Variable shutter permits adjusting exposure at any fps. Camera cannot run when in rackover position. Footage and frame counters always visible. Calibrated tachometer shows fps and times the normal speed at which camera is running. 220-volt 3-phase 60-cycle synchronous motor. Special trip stops camera if film buckles. Internal slot for gelatin filters. Pilot pin film registration. Sound blimp available.

EXECUTIVE PORTRAITS 1855-1958

Carl Maas, public relations expert for Standard Oil, views the changing executive face—and role of the photographer.

The industrial photographer, per se, was an unknown quantity a century ago. The tools of the trade had only begun to be developed. The demand for executive portraits, certainly, was virtually nonexistent. Industrialists were pictured, if at all, at the pen point of a Joseph Kepler of *Puck* or a Thomas Nast of *Harper's Weekly* who put them in cartoons that were scarcely calculated to fill the public's heart with love. To judge from the scarcity of old photographs of captains of industry, either they or the photographers of the time were reluctant to face each other, and of the 61 Southworth and Hawes daguerreotypes in the collection at the Metropolitan Museum of Art, in New York, only one is of a businessman.

Today, however, the industrial photographer includes in his duties as a documentarian of industry, the role of an executive portraitist. And the result is *(continued on page 54)*

1855 • HEAD CLAMPS

The day of the daguerreotype reflected the style of old-fashioned painted portraits. An executive? You'd never know it. But a proper type old George Peabody was, photographed by Southworth and Hawes. Available sunlight from a skylight, slow emulsions, long exposures demanded that subjects sit motionless and set-faced. To aid in holding the tense moment, head clamps, placed out of sight behind the subject's head, were a must. ►

1856 • PROPS

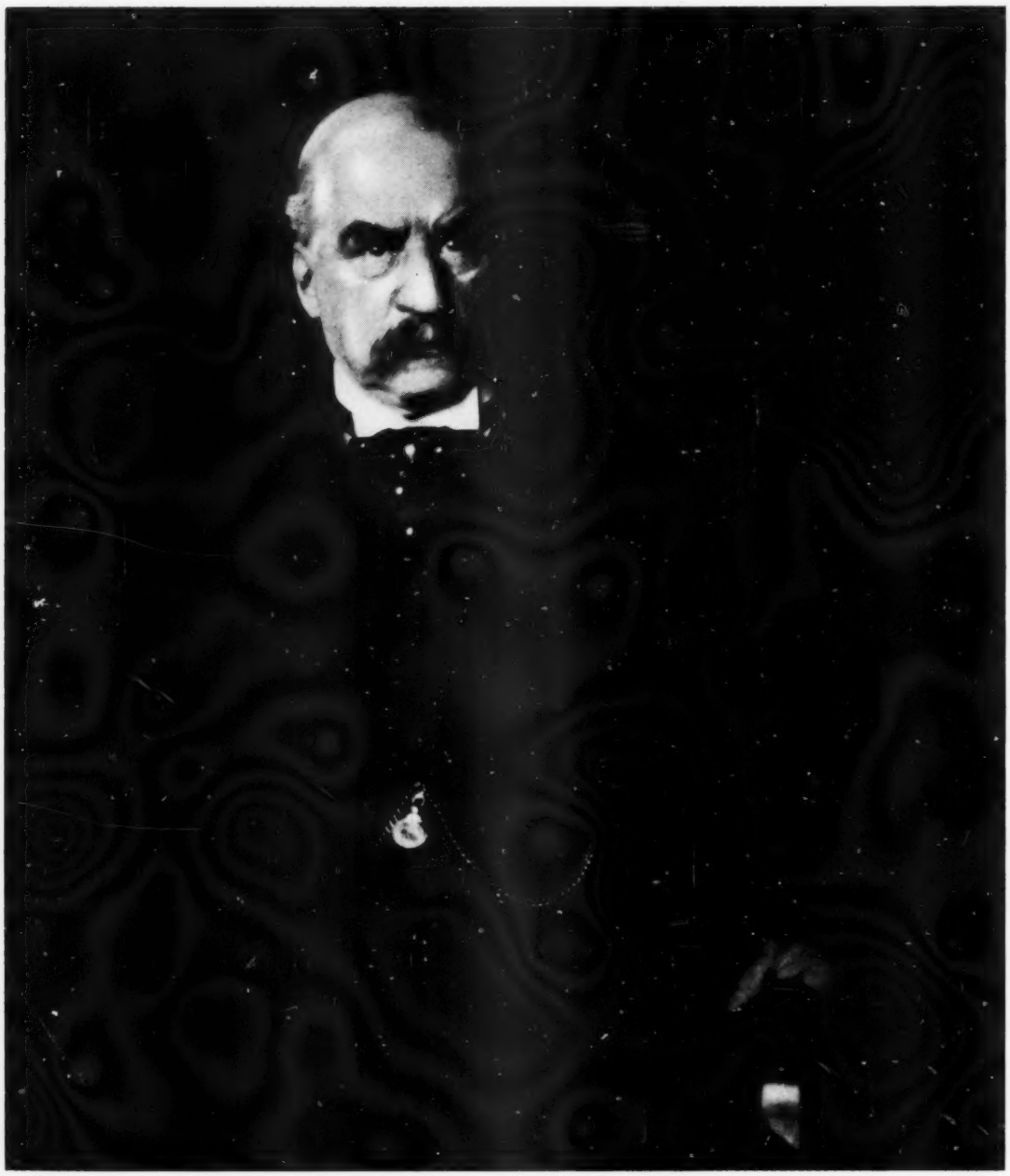
Still there were head clamps, and the limitations of slow photographic processes. The subject (here, merchant-prince A. T. Stewart) is still a little stiff. But now a few props appear which, although not indicative of an executive, show a well-heeled gentleman of the times at ease in a chair. The barest corner of a table, and suggestion of a book, indicate a trend toward putting the subject in his milieu. Curiously enough the photographer, Mathew B. Brady, seldom focused on the visage of a tycoon.

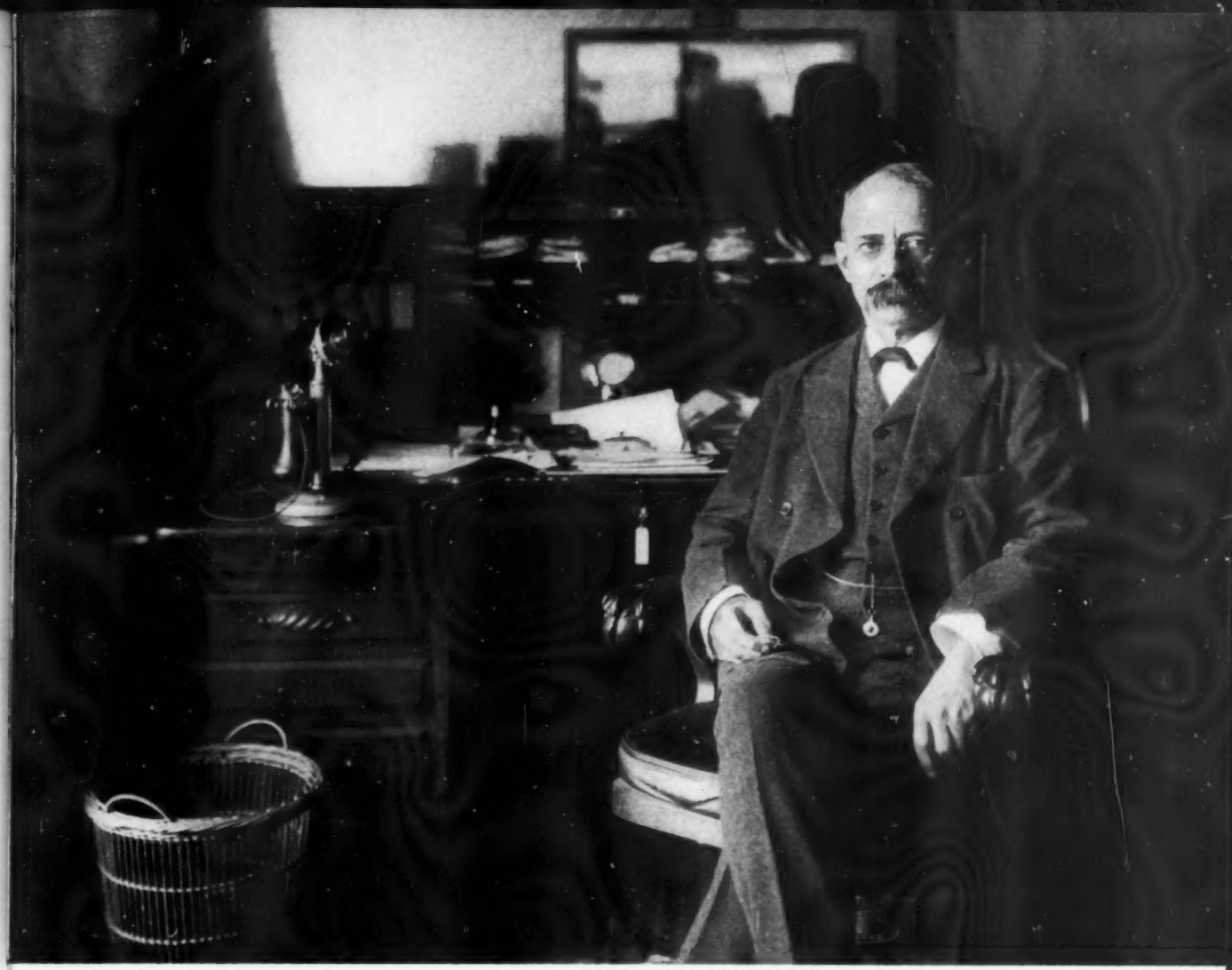
1903 • SYMBOL

By the beginning of the Twentieth century, many of the difficulties in solving the problem of getting sharp images had become old hat. Men like Edward Steichen directed their concern toward interpretation, rather than strict documentation. In the great portrait of J. P. Morgan, Sr., we see an example of what a portrait should be and seldom is, a gripping dramatic symbol. ▼

1901 • MILIEU

In the strides toward realism, some photographers ➤ saw the importance of showing the subject in his natural environment. No studio for Brown Brothers! Camera, flash powder and all, they marched right into the office of railroad magnate Edward H. Harriman to capture this undoubtedly posed, but informal scene. The viewer feels as though he'd walked in with them, too, and that Harriman had just swiveled around from his cluttered roll top desk.





1923 • SOFT FOCUS

In the diaphanous Twenties: soft focus! The sleek were made even sleeker when, at the hand of the retoucher, facial lines, those earmarks of hard work and responsibility, disappeared. It was the fashion, and there was a sameness in the faces of business executives—in their photographs. The environment seen in part in the Brown Brothers picture *above*, was completely eliminated in the Pirie MacDonald photograph of David Sarnoff at *left*. But, like any fad, this particular tangent was of short duration. Like the Roaring Twenties, it went out.

EXECUTIVE PORTRAITS *(continued)*

1949 • BELIEVABILITY

Depression, then war—and a new photojournalistic point of view—brought lines back to cheek and forehead. Photographers like Jerry Cooke took the top guns right out of the carpeted executive office and placed them against a background which had a more immediate meaning. Seen from low angle against out-of-focus stacks, Benjamin Fairless becomes a believable steel king.

1951 • INFORMAL

The other extreme. From formal, posed portraits extracted from the setting of work, the camera is plunged into the midst of a Henry J. Kaiser executive conference. Sweat and seams that showed in pictures of laborers of the Thirties are not required to be convincing here. There is, in the posture of a body, the gesture and expression, another kind of tension caught by Dan Weiner. ▼

Copyright Time, Inc.

1956 • PERFECTION

Tools—camera, lens, film emulsion, lights—perfected by contrast with 1855, and know-how charged like a syphon cartridge, the eminent Karsh emerges as the executive's dream-boat photographer. Sarnoff, 33 years later (see *page 39*) takes on a stature that far exceeds the soft-skinned image of the Twenties. Here is sharpness that gives restrained detail; a simple, yet impressive pose; a half smile; a long executive's cigar—but a human being, nonetheless, who stands as any man, his thumb hooked in his pocket!

SCHEDULE: Key to success of *Apparatus News*. Here, film Production Assistant Ron Kaas schedules shooting.

PLANNING: Abeel discusses story on phone with cinematographer on location and staff member in office.

GE'S QUICK NEWSREEL

Available light, no laboratory frills, enable GE crews to turn out 18-minute information films every two weeks on low budget.

On Monday morning every other week, there's a man in the Midwest who says goodbye to his wife, climbs in his car and drives 80 miles to see a newsreel called *Apparatus News*.

He's really not much of a movie fan and he doesn't have anything to do with the motion picture business. He's an engineer-turned-salesman for the Apparatus Sales Division of General Electric. The newsreel is a fortnightly report, in sound and film, on the latest products, product applications and sales policies of his firm. He is under no compulsion to see the motion picture, but like the vast majority of its potential audience of 2,500, he makes a point of watching the 15 to 18 minute *Apparatus News* whenever it's shown.

Forty prints of the 16mm black-and-white newsreel are rushed directly to GE sales offices around the country, so this man's long trip is unusual. Most of the people who see the movie just take the elevator up to the conference room. But his interest is typical. Each of these sales engineers is a link between industrial customers and the myriad product departments of GE. The customers—which for one salesman might include an aircraft plant, an oil refinery and an electrical distributor—expect precise knowledge from the salesman about every product that interests them. *Apparatus News* satisfies the sales engineer's need for facts.

What *Apparatus News* does

In one year it covered stories in 48 cities in 27 states; it explained applications for 43 product departments. It keeps the audience up to date on company policy and invites the salesmen into research labs for analyses of competitive products. In short, it takes the salesman on an audio-visual tour of the information he needs to know while allowing management to speak frankly and confidentially (customers never see the film and out-

CONTINUITY: A writer-director supervises each story from beginning to end, including shooting on location.

STUDIO: Parts of newsreel are shot on sound stage in Schenectady, N. Y. Sound engineer is in foreground.

siders rarely do) to the salesman without budging from headquarters in New York.

The quality of *Apparatus News* deserves the attention it gets. It goes to the point of the story quickly and tells it well—spicing the uniformly good photography with variety and imagination in camera angle and picture composition.

One could believe that the newsreel is the joint effort of scores of persons. When GE was investigating the possibility before its beginning three years ago, commercial newsreel experts doubted it could be done even with 50 workers. Actually GE manages it handily and at low cost with an editor, two writer-directors and the half-time services of its own Schenectady, N. Y., motion picture production staff of 11.

That *Apparatus News* can be done at all is a credit to its makers and their ability to telescope its processes into a tight but strictly held schedule. They have streamlined the workings of the newsreel by stripping it of everything they could without affecting its quality. How do they do it? Dale E. Wretlind, editor of the newsreel, and Kenneth F. Abeel, head of the Film Production Operation, whose production men spend about half their time on the newsreel, give two examples:

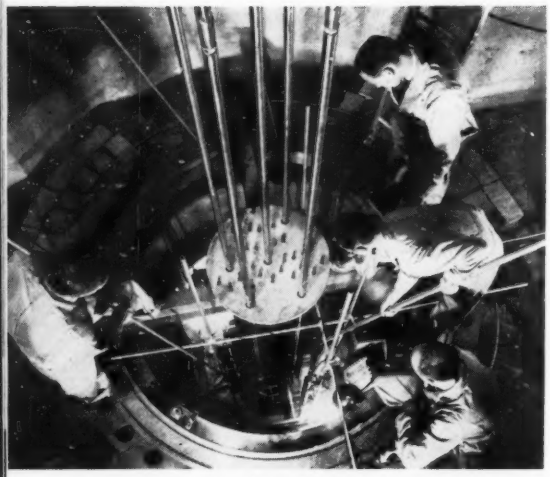
How it's produced

First, complicated lighting setups are avoided. Much of the footage is shot by available light. Outdoors the cameramen use 16mm Plux-X negative. Indoors they switch to Tri-X or Dupont No. 928 negative. "Its speed enables us to get pretty

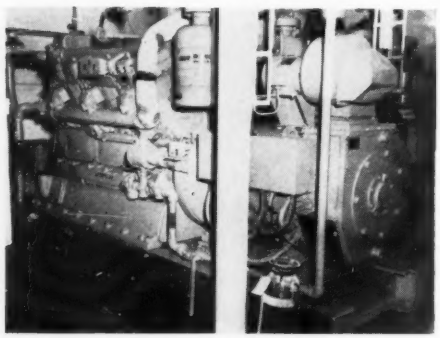
EDITING: The writer-director assigned a story works with editors in cutting and splicing the finished take.

1 Bridgewell, Pa. Stripping operation of 8-in. ingot at Universal Steel Corp. where G.E. Electric Vacuum Arc Furnace was installed.

3 TYPICAL SCENES FROM NEWSREEL



2 Pleasanton, Calif. Fuel elements are loaded into core of G.E. Vallecitos developmental boiling water reactor at nuclear power plant.



3 Beaumont, Tex. Diesel Engine shown attached to G.E. drilling generator aboard Coastal Marine Drilling & Construction Co.'s platform tender.

GE's QUICK NEWSREEL *(continued)*

much everything we need." When the natural lighting on location is inadequate, the men use a maximum of four No. 4 photofloods. If the area is too big for this lighting "we move in tight and shoot several close-up shots rather than rely on cumbersome lighting equipment."

A second timesaver is the elimination of optical effects. There are no wipes, dissolves or fades except in the stock titles used again and again. The elimination of special effects saves GE footage, making A and B rolls, the expense of double printing and, most important, time. The newsreel relies on the straight cut. A scene ends and the next scene begins, immediately. This might be disturbingly jumpy or abrupt in an ordinary motion picture, but it "fits" the newsy, quick pace of *Apparatus News.*

Minimum of special effects

By denying itself the use of optical special effects, GE must be especially alert during the filming of the newsreel. Wretlind gives an example: "Recently, we showed a scene of a ship being launched down its ways. While it was moving we had to change lenses and focus. There is nothing out of the ordinary about this but if we weren't careful about it we'd have a strange looking sequence on the screen. The ship would slide a bit, then jump to the end of the ways. An optical fade could have covered up such an error by indicating a lapse of time between the two takes—but we don't use fades. We could have followed the action with two crews, each with a camera, but that's an expense our budget won't take. A retake would be impossible. We had to get it right the first time even though we did shoot a little cutaway footage. Matching action from scene to scene as we shoot is something we must do constantly."

In a pinch, the cameramen and editors do make sparing use of the "whip" and the "chemical fade." The chemical fade, in which the portion of the film which is to fade in and out of darkness is bleached after negative processing, is the least used. It prevents the exact control Abeel feels is necessary. In the "whip," also called a blur pan, the photographer pans or tilts his camera so quickly that the image consists of an unrecognizable blur. It implies to the audience, "Okay, now we're switching fast to another place."

The job of watching cinematic continuity rests mainly on the writer-director. GE's *Apparatus News* has two. Between them, they do research on the stories, work with cameramen, write the script, supervise the editing and cue the narrator. Each following his own stories through from inception till they are incorporated *(continued on page 57)*

FILMSTRIPS: EASY TO MAKE AND USE

Filmstrips have many qualities superior to 35mm slides—they're durable and can be produced cheaply. Here's how you can make your own filmstrips with equipment most professionals already have.

Of all the materials for audio-visual presentation, there is one which is often least expensive, nearly foolproof mechanically and most compact. It is the filmstrip, a series of pictures the size of a movie frame neatly placed on a strip of 35mm film.

Unencumbered by masks or reels, the filmstrip is simplicity itself. But in many cases it is a good genie in a curled length of sprocket-punched acetate for the industrial photographer. John Flory of the Eastman Kodak Co. points out that American business spends something in the neighborhood of 23 million dollars for audio-visual aids, a large chunk of which goes for filmstrips. Government, educational and religious groups, and private producers undoubtedly spend in excess of that amount for the filmstrip. Commerce and industry use the filmstrip as a publicity device, as a training tool and as a medium-cost, high-impact sales presentation.

It can be counted upon whenever 1) you need 50 to 150 pictures for one presentation, 2) you need a presentation in duplicate, triplicate or greater quantities, 3) you need to send your presentation away from home and therefore want to forestall as many foul-ups as possible.

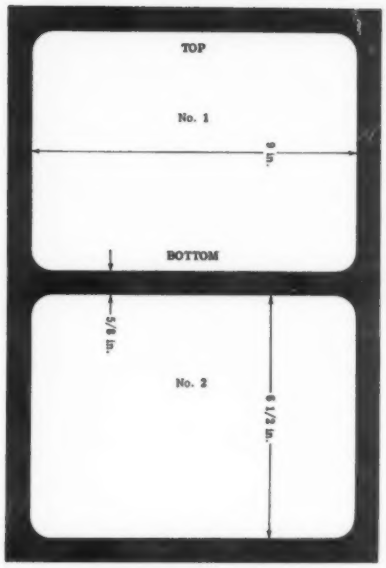
It has much to recommend it. Because the filmstrip is so much like the 35mm motion picture in format, it can be duplicated in quantity at very low cost in standard motion picture printing equipment. In a cassette, a filmstrip can be stored in a salesman's pocket, or mailed for less than a dime. With a projector, the filmstrip delivers high-quality pictures big enough for 50 people to see clearly. What's more the filmstrip has been with us so long that projectors for it are everywhere. The pictures advance through the projector with ease and swiftness. They are not ordinarily subject to the disconcerting heat warps which sometimes pop other still transparency formats out of focus. Once the first frame is inserted and focused, the pictures never get out of order, upside down or backwards.

Making a quick one-copy film

Any professional can make a quick one-copy filmstrip as long as he has a 35mm camera capable of focusing close (or a close-up lens which accomplishes the same purpose), a roll of color film and a means of taking two pictures on a single 35mm still-picture frame. Fine work can be done quickly with such a setup, and this article will tell how to do it. But let us say beforehand that it is limited to the following: a maximum of 72 frames; a single finished filmstrip without the possibility of making duplicates; opaque originals—artwork, black-and-white prints, color prints—of uniform size.

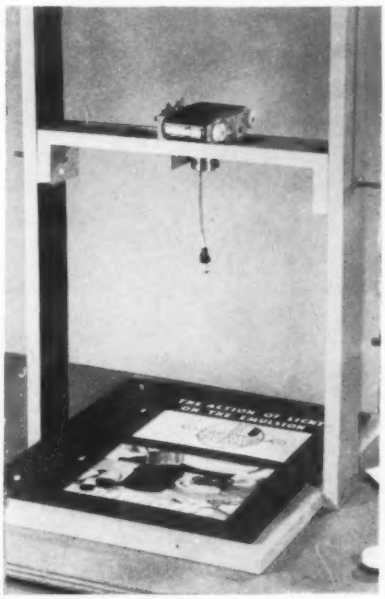
Many of PMI's readers are handling all the phases of filmstrip technique either with their own special equipment or by doing the initial work themselves and turning the remainder of the production over to a studio or lab specializing in filmstrip making. Future articles will delve into the solutions to the the problems of the more difficult techniques, but for the moment our concern will be with this introduction to the medium.

At the outset, let's mention a problem which is common to all filmstrip making. Once the filmstrip is made, it cannot be revised. To change the order of the pictures, add an after- *(continued on page 58)*



MAKE THIS TEMPLATE: You can use any black non-reflective paper or cardboard for this single-frame filmstrip guide. Follow the interior dimensions exactly. Outside dimensions are not important. When making your filmstrip, place copy for successive frames within each white area, make single exposure with standard 35mm 1 x 1½ in. camera using setup similar to that below. Be certain your copy remains flat.

Pictures, courtesy Eastman Kodak Company



A GOOD CAMERA RIG: This is an easy copying stand to build. It's made out of ¾-in. plywood and will hold almost any standard 35mm camera. (See text for more complete details.)

FREE LITERATURE

AUDIO-VISUAL

16mm Sound Motion Picture Equipment **201**

Victor Animatograph Corp. 6-page illustrated folder describing Victor motion picture sound projectors, lenses, loud speakers.

Effective Presentation **202**

Eastman Kodak Co. New 20-page pamphlet on audio-visual film or slide presentation. Sections on how room facilities, seating plans, screen size and type and loud speaker location contribute to effective use of A-V equipment.

Arc Lamp Slide Projector **203**

Strong Electric Corp. Illustrated literature on high-intensity arc lamp projector which is powerful enough to illuminate 3¼ x 4 slides for 30-ft. wide screen and which also projects 2 x 2 slides.

Overhead Projector Presentations **209**

Ampto, Inc. "How to Make Colorful and Dramatic Presentations" is the title of an illustrated 12-page brochure on overhead projector presentations. Described are the problem of presentation, making the transparency, copying from printed texts and preparing charts in color.

Technical Presentations **204**

Technifax Corp. 16-page illustrated booklet on technical audio-visual presentation by John Bateson.

On Your Feet **205**

Polaroid Corp. The how-to of giving a good slide speech with Polaroid transparency slides. 12-page illustrated booklet.

Projection Screens **206**

Da-Lite Screen Co. Catalog of portable and electrically-operated screens.

Slide Binders **208**

Erie Scientific Corp. Price list on fibreboard and glass type-on mounts and aluminum mounts for 2 x 2 and 2¼ x 2¼ slides.

Overhead Projection **247**

Eastman Kodak Co. Making of transparencies is described in "Kodak Materials for Overhead Projection."

CAMERA & LENS

Supplementary Lenses **248**

Spiratone Inc. 19-page booklet giving tabulated data on choice and

---

AERIAL PHOTOGRAPHY

(continued from page 25)

to the more roomy (and faster) Tri-Pacer which can fly safely with the left rear door removed. This puts the photographer on the same side of the plane as the pilot—an advantage in that both pilot and cameraman see the target from the same point of view.

Some large corporations maintain executive aircraft which can be utilized in an emergency or in a limited way. Most of these are multi-engine planes—the DC-3, Twin Beech or Lockheed Lodestar. They are usually much too fast and too large to maneuver in tight spaces and most companies frown on their use for photography. However, pictures can be made by removing the rear door of the DC-3 or the Beech. After being firmly belted in with a waist belt, the photographer is safe and has clear and wide vision. I suggest that if this method is used, a piece of plywood about 15 in. high be braced across the door opening and the photographer sit on the floor on a cushion or parachute seat pack. Another possible vantage point for small camera work in these multi-engine planes is from the co-pilot's seat where a small sliding window can give a 40-degree track of vision.

The increasingly available helicopter is opening new possibilities for the aerial photographer in permitting him to work over congested areas which are usually forbidden to low-flying fixed-wing aircraft.

There are no special problems in shooting from a helicopter except for vibration. Usually a 1/400 sec. exposure will overcome the blur. (For smaller fixed-wing planes in smooth air, shutter speeds down to 1/200 sec. are adequately fast.)

The rental costs of aircraft run from about $20 per hour for the smallest planes to $75 per hour for a Beaver, $100 per hour for a small Bell or Hiller helicopter, and as high as $200 per hour for a large Sikorsky helicopter.

Approach to the best pictures

Cameras and aeronautics aside, how does one produce aerial pictures which rise above mere technical adequacy? I have a practical suggestion to start. In trying to get a picture of a plant, for example, in an unfamiliar location, it is always helpful to drive around the plant and look for landmarks—a farm house painted a certain color, a highway, a creek, a fence. These bearings will help you sort out your targets when you are aloft and confused as to whether you are flying east or south.

Of vital importance is keeping horizons straight. Probably no single factor will spoil an aerial photograph more than a sloppy tilting horizon. If you are shooting close down on a plant structure and the horizon is not visible, line up on some dominant vertical such as a chimney, flagpole or building corner.

But the most important question in making aerial photographs is: How do you compose your photograph so that it is basically a good picture? To the creative photographer one of the most exciting things from the air is the endless variety of pattern formed by streets, rivers, plowed fields. Oddly enough, flat country and water areas make for more exciting pictures than mountains because, looking down, the perspective tends to flatten out high country.

Learning to see exciting pictures quickly as your plane speeds along is a stimulating exercise for the creative photographer. It's an exercise which must be constantly practiced to lift aerial photographs from the monotonous rut of: no action, same angle, same lighting and same flatness. THE END

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use of filters, close-up and minus lenses, filter holders and other accessories.

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Canon Camera Co. Illustrated 10-page booklet on structure and use of Canon Photo Oscilloscope Units with Canon 35mm camera.

Optics **212**

Elgeet Optical Co., Inc. How an optical company can design and develop lenses and optics for the industrial consumer.

Praktina Accessories **250**

Standard Camera Corp. Three booklets giving details of Bulk Film Magazine, Electric Motor and Rapid Sequence Spring Motor for Praktina FX.

View Camera **214**

L. F. Deardorff & Sons, Inc. Price list and descriptive material on 4 x 5, 5 x 7 and 8 x 10 View Cameras and accessories.

Alpa-Reflex **210**

Karl Heitz, Inc. Fully illustrated 34-page booklet describing the 35mm Alpa-Reflex camera, camera lenses, accessories, special copywork, close-up photography, special uses. Filter and lens charts.

EQUIPMENT

Processing Equipment **220**

Leedal, Inc. Illustrated 16-page catalog. Information on darkroom layout, selecting film processing equipment, print washers and other accessories.

Industrial Photo Dryers **218**

Simplex Specialty Co. Folder gives descriptions and specifications for gas or electric, plate and drum photographic print dryers. Illustrated. Included are Peerless Jr. and Senior, Simplex Ideal, Simplex Double Drum, Simplex Plate Glossy, Simplex Hi-Gloss and Simplex Supergloss dryers.

Cold Lamps **219**

Aristo Grid Lamp Products, Inc. Catalog sheet on professional cold light enlarger heads.

Negative Files **217**

The Nega-File Co. 20-page catalog describes files for microfilm, film strips, motion picture film, mounted transparencies, lantern slides, prints and negatives. Illustrated, complete with dimensions and prices.

Color Print Processors **251**

Camera Craft. Specifications and prices of Type C Color Print Processors.

SUPPLIES

Sensitized Materials

Gevaert Co. of Ameri page illustrated pamphlet sensitized papers, roll and product characteristics. uses are shown for produc for special applications.

Papers and Chemicals

The Haloid Co. 12-pag on the characteristics of tographic papers with pro mulas.

Variable Contrast Pap

Ilford Limited. Illustra pamphlet about Multigr Multigrade Filters and instructions.

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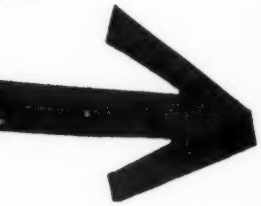

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Materials **222**

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Ray, Inc. Brochure describes ights, spot lights and lighting for industrial motion picture

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tning-Lite Products. 20-page g and price list of portable and -type electronic flash units.

OTION PICTURES

l Printers **254**
Cine Machine Co. Specifica- and prices of professional re- n-and-enlarging printers, 8/16, Also 16 and 35mm continuous rs.

16mm Editing Equipment **234**
Victor Animatograph Corp. Editing viewers, film splicers and rewinds described.

Cine Titler **235**
S.O.S. Cinema Supply Corp. Four pages of data on the S.O.S. titler and special effects kit.

Mitchell 16mm **255**
Mitchell Camera Corp. 20-page illustrated booklet detailing features of 16mm version of the widely used Mitchell professional sound camera.

Film Reconditioning **236**
Peerless Film Processing Corp. 8-page pamphlet describing the cleaning, scratch-removal, repair and rehumidification treatment of motion picture films.

Instrumentation Camera **237**
Traid Corp. Illustrated pamphlet with technical data and operating characteristics of Traid TN-9 instrumentation camera. Price list.

Professional Equipment **238**
Producers Sales Co. Catalog of Acme Equipment cameras, animation equipment, title stand, optical printer, photo-sonic equipment.

Cine Catalog **239**
Camera Equipment Corp. Complete catalog of motion picture cameras, equipment and accessories with rental prices.

Maurer 16mm **256**
Camera Equipment Co. Constructional refinements and a wide range of accessories for this professional 16mm camera are described and priced in this leaflet.

Film Cleaner **240**
Electro-Chemical Products Corp. Folder describes Ecco #1500 film cleaner and its application.

Reversal Processing **241**
Lab TV. 4-page folder gives exposure indexes for 16mm reversal film and prices for processing.

Time-Lapse Cine Equipment **242**
Rolab Photo-Science Laboratories. 16-page booklet describes time-lapse cine equipment, single frame camera drives, microcinema apparatus, synchronomous timers and footage indicators.

SERVICES

Color Slide Duplicates **246**
Hamilton Color. Price list gives prices for duplicating stereo, 35mm and other color transparencies up to 35mm, singly or in quantities of 700 or more.

Color Service **258**
Van Camp Color Corp. Price list of prints, transparencies, color stats, separation negatives and other custom services provided by this New York laboratory.

Color Processing **260**
David Dean Color Laboratories. With illustrations printed by the low cost, short run 3-color lithographic process featured by this firm, a six-page price list details other standard services provided.

by Arnold Eagle

INDUSTRIAL MOTION PICTURES

What camera should you buy for your first industrial? How about rentals?

If you're still pretty green about this business of industrial motion pictures, you probably will wonder just what film size you use. After all, professional motion pictures are always shot on 35mm—or are they?

I've done a bit of research. According to what I've been able to find, 99 3/10 percent of all industrial motion pictures are released on 16mm! There are good reasons.

Since the war (World War II, to keep the record straight) some very excellent 16mm equipment has been developed. Truthfully, it equals most of the 35mm equipment in versatility and precision. Today, most of the industrial films are made for use on 16mm projectors (who has a 35mm projector outside of a standard movie house?). As for shooting on 35mm and then reducing the film to 16mm in printing, there's more chance than not that you'll lose a good amount of quality.

What camera do you need? It depends on the type of film to be made, the subject you're going to shoot and the size of your budget.

Before sizing up your first job and running out to buy a camera in a hurry, stop and think. The camera you get may be totally inadequate for the films you make afterward. What happens when your first film is a silent and then you're called on for lip-synchronized sound, extreme close-ups or stop motion photography in your second production?

Here's a solution. Go rent a camera. There are many excellent rental services in the large cities and they'll be glad to make arrangement for shipment in case you're not a citified photographer. We'll be glad to send you a list of rental services if you drop a self-addressed stamped envelope to Arnold Eagle, PMI, 33 West 60 Street, N. Y. C.

You'll find rental equipment quite reasonable. For instance, a Cine Kodak Special II with lenses will cost about $10 per day. A 16mm Mitchell, which is a bit more in the Cadillac or Rolls Royce class, is understandably about $50 per day. In addition you can also rent lighting or sound equipment. What camera should you try?

Let's assume now that you will rent your first camera—or better still, rent a number of different cameras for successive films to see the differences between them. We won't get into the details of operating instructions now. Actually, every camera is very easy to operate. With an instruction book or the help of a technician from the rental service, anyone can learn just about all there is to know mechanically about the various cameras in about an hour.

You'll find a complete chart of the various cameras and how they differ on *pages* 34 and 35.

After you've fooled around with rental cameras for a while and have a few movies under your belt, you can think in terms of buying.

Film drives: spring or electric

Most of the semi-professional cameras operate on a spring drive although most of them can be fitted with an extra electric motor. The advantages of a spring-wound camera are that it is light and it can be operated anywhere because it does not depend on an outside power source. The shortcoming of a spring-wound camera is that it runs only a short length—15 to 40 feet—on one winding, and in spite of a governor the speed is neither consistent nor dependable.

The electric motor found on most professional cameras runs either on batteries or a 110 or 220-volt alternating current. These motors are either of variable speed and can be regulated from 8 to 90 frames per second, or they are the synchronous type used for sound cameras running at 60 cycles per second at a constant 24 frames per second. The synchronous motors are a must when doing lip-sync and when sound is recorded on a separate machine. Two synchronized motors powered by the same source are interlocked and run at exactly the same speed.

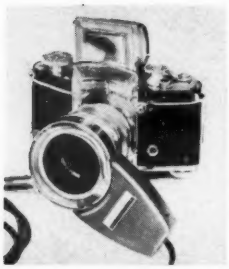
When sound is recorded during shooting, camera and motor must be "blimped." The blimp is a soundproof housing that deadens all the camera and motor sounds so that the microphone will not pick them up. Some sound cameras, such as the Auricon, have built-in soundproof housings and do not require extra blimping for sound recording. The Auricon is also fitted with a galvanometer or a magnetic recording head so you can record the sound directly on the film as it is shot. This is called single system sound.

Lenses and turrets

Lenses of different focal lengths have a special value for motion picture cameras. Unlike the still shot, the movie frame cannot be reduced or enlarged or cropped after being shot. But films require long shots, medium shots and close-ups. Professional motion picture photographers must have the use of different focal lengths as well as an easy method of changing lenses. Most professional cameras have a two, three or four lens turret so different focal length lenses can be flipped into place easily. The most useful lenses are the one-inch or 25mm normal, the wide-angle with a focal length of 15 to 20mm and the long lens of 2 inches or over. All the lenses used on a camera or cameras for the same production must be matched for color rendition and light transmission. As you may know, there can be as much as 50 percent difference in light transmission with two different lenses set to the same f/stop. Use T/stop lenses calibrated for the actual light transmission value rather than f/stop lenses (calibrated for the theoretical transmission value).

Film loading

The film is loaded either directly into the camera or in separate magazines. When film is loaded directly into the camera, daylight loading film is used. This comes in 100-ft. lengths although some cameras can take 200-ft. rolls. There's a disadvantage to daylight loading film. A 100-ft. film reel lasts only 2 minutes 47 seconds and you always run out of film at a crucial moment. Don't be fooled by "daylight loading." All loading should be done in a well-shaded place. THE END



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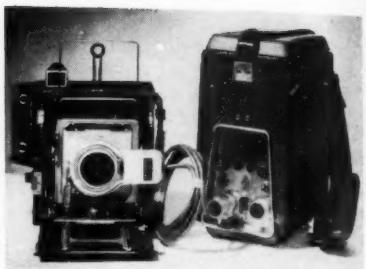

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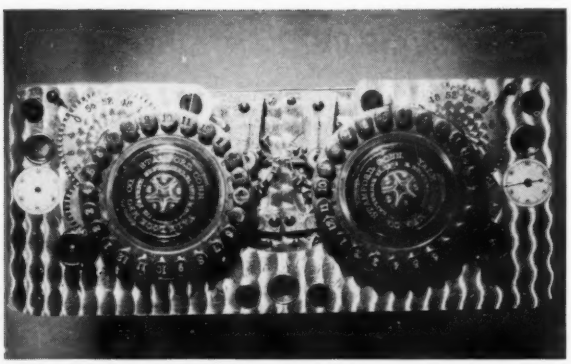
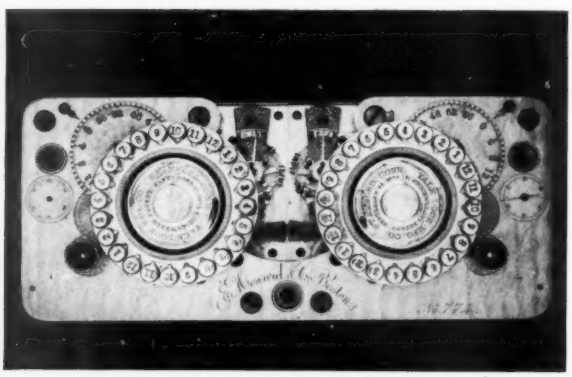
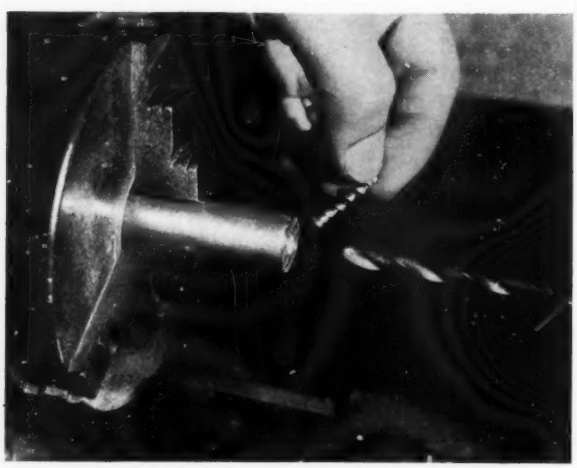


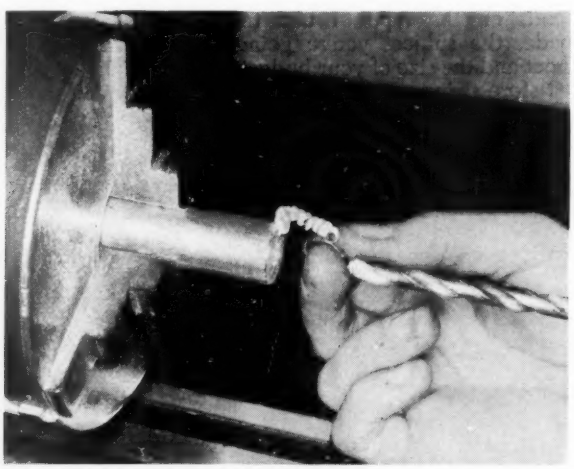
ORDINARY lighting casts double and triple shadows, obscures intricate clock detail, darkens shine of metal.



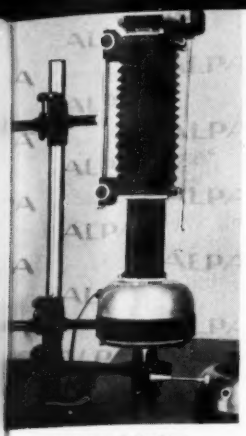
SHADOWLESS light from Type B Hinelight reveals detail, satiny texture of metal. Both pictures by Sheldon Hine.



SINGLE electronic flash casts impenetrable shadows, causes "hot spot" reflections, confuses photograph.



RING electronic flash simplifies pictures and close-up picture taking. Don Auerbach made both photographs.



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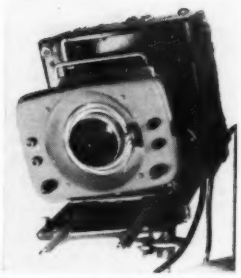

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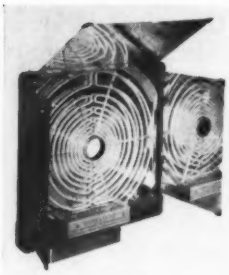
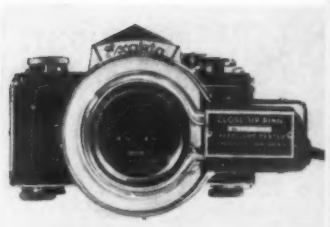
HINELIGHT





SPEEDLIGHT CENTER

LIGHTS FOR CLOSE-UPS

New and compact lighting units surround the lens—how their shadowless light aids the industrial and scientific photographer

A photographer works for a Pacific Coast manufacturer of electronic assemblies. The company engineers make test circuits on little boards. When they get what they are after, they call in the photographer to make a picture of the mock up. The purpose is a clear record for reference and a visualization for draftsmen. Formerly, the pictures were a tedious chore. Bad enough that the little boards looked like a snarl in a sewing machine, shadows added to the confusion by adding wires that didn't belong.

The photographer arrived at another technique while experimenting. He set his camera on his sturdiest tripod, shut the lens down to a virtual pinhole and carefully painted the little board with a 10-watt bulb on an extension cord. Exposure took a minute and a half, but the results were acceptable—unless vibration blurred the picture or, in working so close, he accidentally flashed the lens with the light.

Perfect circle

But today he has a solution he considers ideal. He uses a ring light—a circular electronic flashtube which mounts directly on the lens. He walks in, holds the camera above the mock-up, focuses, shoots and walks out. His negatives are so consistently exposed that he has given up taking a second shot to "cover" himself and he knows beforehand that his prints of the mock-ups will require a 10½ sec. exposure. They never need dodging and he hasn't had a shadow to worry about since he started using the ring light six months ago. He is able to supply color transparencies and prints just as easily. It saves him a lot of time for more interesting pictures.

Another photographer uses the ring light with equal effectiveness in a police laboratory. He uses it for pictures of bits of cloth, fingerprints, fragments of one thing and another which might serve as clues or evidence. Because his equipment is so compact and completely portable, he can take flawless close-ups anywhere almost as fast as he can change film holders.

A third photographer works in the laboratory of a school of dentistry. He takes picture after picture of people's mouths. Ever tried to light up the roof of someone's mouth? It's a tricky exercise for yourself (but a jawbreaker for the subject) and it can be done any number of ways, but none is so quick or so efficient as using the ring light.

Advantages of the ring light

The circular light units now on the market refine the solutions to close-up lighting problems into a neat package. They have three main advantages.

1. *Plenty of light in close quarters.* Extreme close-ups often require more light than normal distance photography because of the light reducing effect of bellows extension. Bringing ordinary lights into play is often difficult because the camera itself is likely to get in the way either

RING LIGHTS *(continued)*

mechanically or by casting a shadow. The ring units, attached to the lens, bring more light into play the closer you get. They are usually effective past the limit of your lens extension.

2. *Elimination of shadows.* The light from each point on the ring cancels out the shadows cast by the light on the opposite side of the ring. And, although the shadows are gone, modeling remains. Planes closest to the lens get slightly more light than those further away. Rounded surfaces or slanted planes show their form with delicate differences in tone.

3. *Cavity lighting.* The light from the ring units falls uniformly on the sides and bottoms of cavities—threaded holes, complex small parts and, as mentioned above, the human mouth.

Electronic flash ring units are especially suitable for color photography at close range. They provide sufficient, evenly spread, soft light of an exact color temperature.

The tungsten Alpha Macrostat circular light system and the fluorescent Aristo Mic-O-Lite are viewing lights as well as illuminators for macrophotography and photomicrography.

The Type B Hinelight, which uses a series of concentric fluorescent tubes, gives broad highlights that are especially useful in photographs of highly reflective surfaces such as chromium plated parts.

Old problem, new twist

Ultra close-ups with ring units involve a classic exposure problem—with an unusual twist.

The exposure problem is bellows extension. The bigger you make the inside of your camera by racking out the lens or by adding extension tubes, the dimmer the image gets. In mathematical terms, the fall off occurs in a ratio of inverse squares. Doubly extending the bellows quarters the amount of light falling on the focal plane.

The twist with a close-up ring light is that, as you move in for close-ups, the light attached to your lens moves in closer, too—counteracting the effect of bellows extension. This relationship is fairly complex. As you move in closer, the amount of light falling on the focal plane increases to a maximum, then drops off sharply. Near this maximum, a one-inch distance can mean a full stop difference in exposure in some cases. How, then, do you figure exposure?

One way of circumventing the problem is to use an auxiliary close-up lens. It enables you to get on top of your subject without markedly changing the lens-to-film distance. Then you merely take a meter reading of the subject, or divide the lamp-to-subject distance into the guide number for your particular unit to get your f-stop.

Another method which is simple and precise works only with the fluorescent or tungsten ring light units. You take your light reading directly at the ground glass with a specially sensitive meter —such as the Densichron.

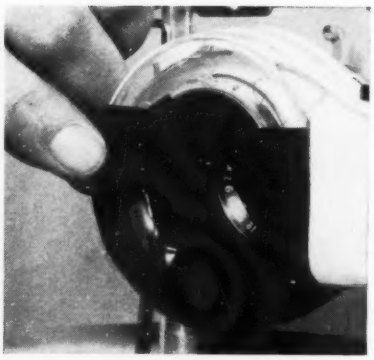
If you don't mind a little mathematics, you can substitute in this formula:

$$\text{f-stop} = \frac{\text{guide number} \times 12 \times \text{normal focal length}}{\text{lens-to-subject distance} \times \text{lens-to-film distance}}$$

It, of course, is intended for electronic flash ring units, with which a guide number is furnished. It assumes shutter speed is practically inconsequential. The 12 is inserted to convert guide numbers from feet to inches. All other measurements should be in inches, too. *(continued on page 58).*

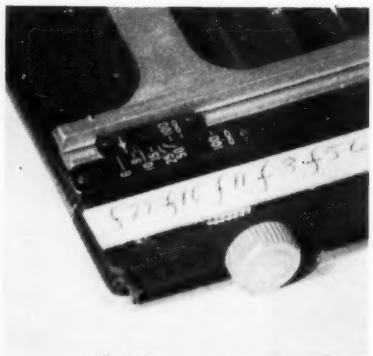
HINTS ON CLOSE-UP TECHNIQUE WITH ELECTRONIC FLASH RING UNITS

Don Averbach, American Speedlight Corp.



DON'T take head-on pictures of highly reflective subjects such as eyes, mirror-finish metals or glass.

CREATE slightly directional light or cut down ring unit's strength if necessary by taping bottom of ring.



BENCH MARKS, f-numbers indicated on camera bed, give precise exposure when extending bellows for close-ups.

by LLOYD E. VARDEN

PHOTO METHODS FOR TOMORROW

Hope on the horizon for handier, water-soluble chemical packages

In the December 18, 1957 issue of *Amateur Photographer,* published in London, an editorial suggestion was made that photochemists could possibly develop a new and more convenient means for packaging processing chemicals by borrowing a recently adopted method for packaging household dyes. These dyes are available in England in water-soluble plastic envelopes. The dye—package and all—is simply placed in the required amount of water and stirred for preparing the coloring solution. Why not, then, package dry powder chemicals for making developing and fixing solutions, etc. in a water-soluble plastic material? It would eliminate air-borne chemicals that settle on darkroom apparatus, frequently causing troubles such as brown specks on prints, so states the editorial.

Soluble package experiments

The editors of *Amateur Photographer* have made a good suggestion, but their opinion that the idea "has not yet reached the photographic field" is not altogether correct. This writer began tests many months ago with water-soluble plastic film materials for packaging photographic chemicals. These special, transparent films have been used for some time in America for packaging a variety of products. But the first types introduced were either unstable to many chemicals used in photography or absorbed too much moisture from the air. Tests with later types are rather encouraging, however, even if a few problems do remain before this method of photochemical packaging can be considered commercially practical.

I have no doubt that we shall see some radical changes in chemical packaging in the near future. Water-soluble films do not represent the only approach to eliminating chemical dust and other difficulties associated with dry powder preparations. Concentrated liquid developers and fixers solve many of the problems, but introduce the further problems of breakage and excessive shipping weight. Another idea worthy of consideration is the use of porous cakes in which all of the components for a solution are pressed into oversized pills. This has been used for small solution volumes since the dissolving of one or two small tablets presents no problem. But a pressed cake the size of a big bar of soap or larger is not readily broken up for rapid dissolving. If the cake could be made porous it would dissolve with greater ease and could still be handled as a unit. What's more, if an acid salt were placed in the mixture along with a chemically equivalent amount of a soluble carbonate, the cake would disintegrate when placed in water just like an Alka Seltzer tablet. And the advertising copy writers could claim that darkroom headaches are eliminated!

Another color process

Many readers will recall the Birch Field process introduced in the early 1940's for which it was claimed that any black-and-white negative made with panchromatic film could be converted to a full color image by use of a special color filter. A black-and-white positive transparency was made from the negative, then projected onto a screen through the filter. The filter consisted of a series of concentric circular color filter bands. The inventor claimed that the chromatic aberration of the camera lens caused the image silver to form at slightly different depths within the emulsion layer. His filter was supposed to be so designed that this color separation "inherent" in images recorded on panchromatic film could be utilized to reestablish the original colors of a scene.

There is no need to recite the reasons for the impossibility of such a process actually working. Suffice it to say that the process died a quick death.

But now I read that a process which strongly resembles the Birch Field process was demonstrated in early December, 1957 at the Shamrock Studios in Winter Park, Florida. Why can't the dead be left to rest in peace!

The "new" process, according to what I read, is the result of fifteen years of research on the part of Dr. Warren Millais. The technical details of his system have not been revealed, but it is reported that any picture exposed on black-and-white panchromatic film can be reproduced in color by use of a special filter over the projection lens. Already existing black-and-white negatives are said to be entirely suitable provided they are reprinted to have "densities corresponding (sic) to the Millais process requirements."

The principal application for which the process is being sponsored is in color television broadcasting. But the published explanations of the general principles of the process are so hazy that I doubt that highly technical TV engineers will be satisfied with them. In one breath it is reported that a special color filter is used over the *camera* lens (when exposures are made especially for the Millais process), but in another it is said that this is not a necessary requirement. This order of flexibility is supposed to derive from the one "known" fact about the system: it is "based on the relationship of certain film densities to color wave lengths," whatever that means. THE END

PHOTO DEPARTMENT ANALYSIS

(continued from page 32)

sides, is the printing and enlarging room. All water is run through thermostat units and wherever the water is used for washing purposes it is filtered through Oscar Fisher filters. One bank of darkrooms has its current pulled through a constant voltage transformer so that color work can be done without worrying about voltage fluctuations. It was much easier to buy a large, surplus, constant voltage transformer and pipe all the juice through it to these three rooms than to put individual units in each room. The printing and enlarging room has an 11 x 14 Pako contact printer which has been altered to operate on a multitude of Argon bulbs (picture, *page 32*). Anderegg worked on the wiring diagram off and on for about three years

(continued on page 59)

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EXECUTIVE PORTRAITS

(continued from page 36)

that the public is now beginning to recognize that industrial executives do have real and interesting faces, as well as the names and reputations of lions of the business headlines. This is due in part to the development of photographic tools, of the skill and imagination of the photographers who use them, and of the changing, maturing attitude toward the meaning and purpose of a picture.

The style of industrial portraiture has come a long way since the day in 1855 when Southworth and Hawes placed stern head clamps behind even sterner George Peabody (*page 37*). Or since Mathew Brady, who photographed nearly everything in sight, focused on merry-faced, merchant prince A. T. Stewart, his early benefactor *(page 36)*.

In those early days the pose was formal—stiffened, most likely, by the slow techniques by which the photographers had to work.

Having a camera portrait made (the thrifty sitter could be immortalized on tin for as little as 12½ cents) in the Fifties, Sixties and Seventies was both a circus and a chore. Pictures were made by several methods including the favorite daguerreotype, the cheaper ambrotype, the popular tintype and the carte-de-visite. In those days the only light was what we call "available" and dark days were indeed dark for the portrait photographer's business. Exposure took longer than it does now and holding steady for a minute or more in strong summer sunlight filtering through the skylight was no fun. And sunlight could be hot. If the sitter lost his muscular control and blinked the picture had to be remade because of the difficulty of retouching glass negatives.

Techniques grow—not style

By the Seventies, photography began really to catch on and, although the businessmen went along with the crowd, most of their portraits are of interest mainly as quaint historical documents. During the Eighties a number of inventions including the anastigamatic lens, the dry plate, flexible film and the hand camera, particularly George Eastman's Kodak, did much to make photography a quicker and easier job. However, an easier job did not necessarily mean a better one. In fact, with a few exceptions, portraiture retrogressed during this period. Poses were stilted and repetitious and the ease of retouching dry plates and film led too frequently to careless and unimaginative work. This state of affairs lasted well into the twentieth century.

Once in a while we run across a gem of a portrait such as the Brown Brothers 1901 picture *(page 39)* of Edward H. Harriman, the railroad king. More than half a century later we can look at this picture and feel that we have just stepped into the man's office. Everything is absolutely right, the off-center composition, the derby hat on the roll top desk, the clutter of papers, the highlighting of the old-fashioned telephone, the curve of the wastepaper basket repeated in the phone base, the chair seat and the fold of Harriman's jacket. As he should, the man looking like a bright and angry mouse dominates the scene.

Seeing the symbol

Another fine, in fact, great photograph was made of J. Pierpont Morgan, Senior, in 1903 by Edward Steichen. This is an example of what a portrait can and should be and too seldom is. This is not only a lion of a man's face at the "decisive moment" but it is also a timeless symbol. This is an individual of immense inner drive who appears to be a direct spiritual descendant of a Hadrian, a Lorenzo the Magnificent or a Louis XIV. It gives us a deep insight into the temperament that can say *"L'etat c'est moi"* or growl "I am not in Wall Street for my health."

After this high point photographs of business leaders went into soft focus. The only non-specialized American magazine that published any quality photographic portraits was *Vanity Fair*, thanks to the taste of the editor, Frank Crowenshield, and the art director, Hevworth Campbell. *Vogue* meanwhile was pushing the work of Baron de Meyer whose pictures always seemed to have been taken through several layers of chiffon. This was fine in fashion photography where back lighting, romantic compositions and the fragile faces of such Ziegfield beauties as Helen Lee Worthing could give the magazines' readers the illusion that they too could be beauties if they only had the same photographer. This diaphanous style of photography became fashionable not only for women but for their executive husbands as well. A few practitioners of this art began to specialize in portraits of men, especially men of affairs (see Pirie MacDonald photograph of David Sarnoff, *page 39*).

During the 1930's things began to

change and again it was due largely to the influence of certain magazines, particularly *Life* and *Fortune*. *Fortune* brought over from Germany the late Dr. Erich Salomon and his Leica and the term candid camera soon came into the vernacular.

Natural man vs. executive

The terms photojournalism and documentary photography also came into wide use. Photojournalism had become a potential in the 1880's with the invention of the half-tone plate; documentation is implicit in every photograph. In later years—the F.S.A. days—the outstanding abilities of Walker Evans, Dorothea Lange, Arthur Rothstein, Russell Lee, John Collier, Jr., John Vachon, Gordon Parks, among others, created a tremendous impact on the vision of not only Americans but persons abroad.

Pictures in the sharpest possible focus became *de rigueur* and enlarged pores and plenty of wrinkles became criteria of a photographer's integrity. The man behind the plow and the worker in heavy industry became symbolic of the face of America. The combination of faster film and cameras, sharper focus, weather-beaten faces and uninhibited expressions proved to be irresistible to editors. Unfortunately, while this was happening most executives continued to present placid and heavily retouched faces to the public.

The human being reemerges

But now, even their faces are changing due to the work of such men as Karsh, Jerry Cooke and Dan Weiner, and to the demands of editors and the advice of public relations experts.

The work of these photographers —sometimes it seems to dominate the sitter, but this is also often true in life—represents a wide range in present day portraiture. Karsh is the executive's dreamboat photographer (see his portrait of Sarnoff 33 years later, *page 41*). This may be because he has a magnificent flair for lighting and the eye of a caricaturist. His best pictures are nothing short of overwhelming—which is a strength in photography but also a weakness so far as public relations pictures are concerned.

Jerry Cooke has developed a somewhat stylized type of portraiture in which a man and his work are inextricably woven into the composition (Benjamin Fairless, *page 40*). And yet his work is not done in a self-conscious manner. The people in his pictures seem to be on the spot as if by accident and there is always a fine interrelationship in scale between the human and the mechanical values. Dan Weiner is primarily interested in people. He has a remarkable eye for essential human qualities and a talent for capturing them on film. Free of what psychiatrists call hostilities, he manages to give a warm quality to all of his subjects while at the same time making a perfectly true picture, as the informal group portrait, *page 40*, indicates.

The excellent portraits by industrial photographers are now being seen more widely than ever before. In the early days, the image of a tycoon perhaps hung on a wall, or sat on a desk. But today the media where executives' portraits are seen have expanded considerably. Magazines and newspapers and, obviously, company house organs and stockholders' reports, have become the showcase for the industrial photographer's work.

New markets: new demands

Now, quite unlike Brady or Brown Brothers, he must gear his pictures for several markets, and shoot and process accordingly. Decisions about details such as format and print surface become everyday considerations. If ordered for a one-column cut, a picture might be lost as a horizontal, and be more impressive as a vertical. For full-page reproduction, the vertical stands more of a chance. Doubtless the local newspaper, or any newspaper, for that matter, reproduces best from a glossy print. Yet major magazines frequently work with glossies dried matte.

Despite the new demands in portraiture, too many companies continue to release to the press executive portraits that are of interest only to the sitter, his family and business associates. This is a pity. For the picture which shows the real character of a company's management can do much to stimulate a greater public interest in the firm.

This can be—and has been—accomplished often by small, but significant details. By including out-of-focus smoke stacks behind an executive head *(page 40)*, or placing a hand on a globe of the world *(page 41)* or by taking in the weary postures of an executive conference *(page 40)*. How much more meaningful it is to be concerned with the *activities* of human beings, rather than their bland, retouched faces or machines alone!

This is both the challenge to, and the success of, the contemporary industrial photographer. THE END

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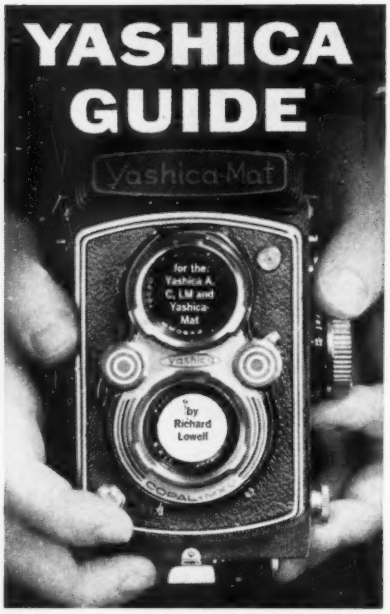

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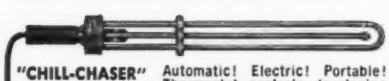

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NEW PRODUCTS

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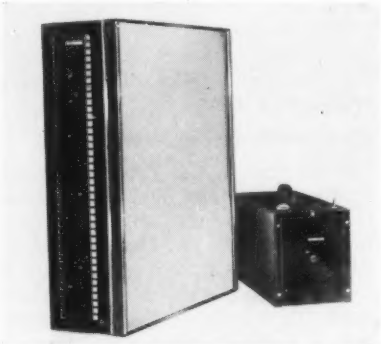
Aristo Trans-Luminator 101

Designed for exposing printed circuits, the Aristo Trans-Luminator's effective brightness is said to be comparable to the carbon arc lamp, but to consume only $\frac{1}{10}$ of the current. The manufacturer claims that the Trans-Luminator produces a



cool, even and highly actinic light (the property of radiant energy by which chemical change is produced). The Trans-Luminator is equipped with Aristo blue lamps, which peak at 4500 angstroms. The lamp is built in the form of a grid designed to produce optimum evenness of illumination. The unit comes in two parts—a lamp housing and power pack connected by a cable. Thickness of the Trans-Luminator is only 6½ in., but width and length range from 12 x 12 to 32 x 36 in. It can also be used for printing negatives for templates and layouts.

Safe Kodak Film Cleaner 108

A new Kodak film cleaner is safe from fire hazards and can be used for black-and-white and color negatives or transparencies. You apply the solution with a soft, lintless cloth to remove dust and dirt from films. Price is 90¢ for a four-ounce bottle.

Adapter for Hasselblad 102

The Tiffen Bayonet Adapter Ring No. 820 fits the new Hasselblad 500C 2¼ x 2¼ single-lens reflex camera. It makes possible the use of Series 8 filters, lens shades and other accessories, as well as standard Hasselblad accessories.

Cine Analysis Projector 106

The Wollensak Motion Picture Analysis projector has a 1½-in. f/1.8 projection lens and a projection rate of either 2 frames per second, 16 frames per second or one frame at a time. A single lever controlling the rate can be switched from one setting to another while the projector is running. The single frame feature may be controlled at the projector or at the screen by a remote control device. Specific frames can be quickly identified through the frame counter. Construction is of aluminum alloy casting, with a 250-watt lamp supplying illumination. Film capacity is 800 ft. Model WF-329A is for 8mm perforated film and costs $550. Model WF-329B is for 16mm film, sells for $510.

Cinephonic Sound Camera

The Cinephonic 16mm camera is the first single system sound camera designed specifically for magnetic sound. It records the image and sound on film that has been magnetically striped. The built-in transistor amplifier has its own power supply and can be operated by one man, because the sound-level meter in the viewfinder makes it possible to check the sound level and action at the same time. A revolving eyepiece on the parallax corrected viewfinder adjusts for 1, 1½, 2, 3, 4, 5, and 6-in. lenses and can be modified to cover fields for 17½mm to 4-in. lenses. Other features of the camera are interchangeable 100 and 400-ft. magazines, a three-lens C-mounted turret, single sprocket drive, film transport, volume control and three-way operating switch. A portable power supply is available.

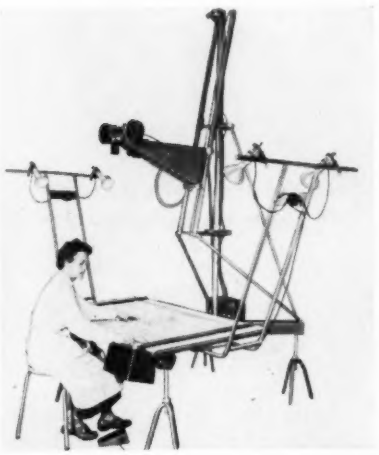
Price of the Cinephonic, including built-in amplifier, built-in amplifier power supply, detachable 100-ft. magazine with built-in footage counter, Electro Voice low-impedance microphone, and carrying case, is $2,050.

Correction

Price of the Nems-Clark TC-100 Electronic Timer, incorrect in our January issue, should be $340.00.

Microfilm Camera 103

Automatic exposure control of the MT/0 35mm microfilm planetary camera is said to compensate for variations in voltage as well as background density, eliminating the need for exposure meters and voltage controls. Copy reduction range



is 12X to 30X. Either foot pedal or hand control operation can be used, and the 40 x 60-in. copy table handles all drawings through E size (37½ x 52½ in.).

The film footage indicator, audible end of film alarm, audible and visible completion of exposure cycle indicators, variable masking, variable pull-down, visible film transport indicator, electric film spacer control, document hold-down bars, reduction indicator, and vacuum platen at film plane, are standard equipment. Accessories include an enlarging attachment and 16mm conversion kit.

The MT/O camera is produced by the Microline Products Group, Ozalid Division, General Analine and Film Corp., Johnson City, N. Y.

Improved Reflector 109

Sun Ray announces a new satin finish on their No. 32 lamp, which will furnish a considerably increased light output.

Designed for No. 4 photoflood or 1000 watt tubular bulb, the No. 32 is supplied with a bulb-centering device, universal arm, mogul socket, heavy-duty switch, 15 ft. of cord, and plug. Fitted side shields, diffusing curtain and a carrying case accommodating two lamps and two tripods are available. Basic lamp is priced at $25.00.

GE's QUICK NEWSREEL

(continued from page 44)

in the work print. This method in part accounts for the newsreel's speed and economy.

Because the writer-director has a good idea of what's important to the story, he can and does eliminate unnecessary shots on location. Furthermore, he knows the format of the finished product and is experienced with the editing. He also knows that the scene length is short (it averages five seconds in final form) and has a rough idea of the finished length of the story (stories average two minutes on the screen; may be as short as 30 seconds, long as three minutes). Thus between the writer and the cameraman, much of the editing is done in the camera. The ratio of footage to final edited film is a low three-to-one.

Three camermen from GE's Film Production unit do most of the shooting. They use a Mitchell 16mm for studio shots, are assisted by soundmen who record studio sync sound on both 35mm and 16mm magnetic tape, for insurance. On location, each camerman has only the help of the soundman and writer-director. Cine-Kodak Specials and Bell & Howell Films are used for silent location footage. Auricons and Magnasync 16mm magnetic film recorders are used to cover sync sound news stories. Often the cameraman himself whacks the clap stick. Depending on circumstances, location shots in places far from Schenectady are sometimes assigned to free lancers and commercial studios. If a writer-director cannot be on hand while these stories are filmed, he sends along a shooting script.

Four-week cycle

The newsreels are produced in a four-week cycle, with some overlap because a new cycle begins every two weeks. On Monday of the first week, Wretlind submits his plans to the advertising and sales promotion heads of GE's Apparatus Sales Division.

Some of the footage has been shot in advance of this approval session, but the remainder of it must be done from Monday afternoon to Thursday of the first week. By that time all the film has been sent to Movielab Film Laboratories in New York City to be developed, edge-numbered and duplicated with a work print. The lab holds the negative and rushes the work print back to Schenectady.

By Monday of the second week, the work prints of all the stories have been screened. Each of the writer-directors works with an editor from the Film Production unit. The film editor relies on the writer-director for judgment of the relative importance of the scenes. The editor is responsible for the technical quality of the film and for such details as "beating the scenes out to music" to make it simple to add the musical score later.

By Thursday of the second week, each of the stories that make up *Apparatus News* has been edited and location sync-sound has been re-recorded from 16mm magnetic tape to 35mm magnetic tape. The newsreel commentator then reads the approved script against the projected picture. That afternoon GE combines the individual units into sequence. The job is finished Friday morning. At 9 A.M. Friday, writers and production staff see the edited and assembled work print with sound interlocked in sync.

At 10 A.M., Advertising and Sales Promotion Department Managers see this interlock version of the issue. After approval and a final check, the film and sound track go to Langlois Film Music, Inc., in New York City.

On Monday of the third week, Langlois sets up the music sound track on 35mm magnetic film. Tuesday, the picture work print and the two magnetic sound tracks, one for voice and one for music, are sent to RCA Recording Studios. RCA combines the magnetic sound tracks on a 16mm photographic track and forwards the exposed sound track and the work print to Movielab. This firm conforms the picture negative to the work print, develops the 16mm sound track and makes an answer print which is checked by Wretlind on Thursday of the third week. Any necessary changes are ordered. The final 41 prints arrive in Schenectady early in the fourth week; one stays at main headquarters, the rest are shipped as soon as they're received. The majority of the Apparatus Sales Division salesmen see the newsreel by the following Monday. The prints ultimately have four or five showings apiece. They remain in circulation for 60 days and then are destroyed.

Apparatus News editor Dale Wretlind emphasizes that the newsreel does not replace other motion picture or printed promotion material. Rather, it complements them, bringing urgent information to the sales engineers and other personnel in the audience of 2,500 in an immediately comprehensive manner—even after an 80 mile trip. THE END

RING UNITS

(continued from page 52)

Whichever method you use to get your basic exposure, it's a good idea to try out your ring unit at various close-up working distances. If you take careful measurements, bracket a number of exposures at each distance, keep careful records and view the results critically—you'll end up with an exposure guide as dependable as any you could hope for in photography. You'll have no shadow detail to worry about, because ring lighting is shadowless. You'll know that if you rack your lens out to a certain distance from the subject, the exposure will be the same as when you made your tests. "Bench marks" on the focusing scale can speed the process even further.

Here's a rundown of currently available commercial ring units.

ELECTRONIC FLASH

► American Speedlight Corporation, 63-01 Metropolitan Ave., Middle Village 79, N. Y., offers a Model AL-417 Circular Light Unit for 400 or 500 Series Ascorlights and a Model BL-411 Circular Light Unit for 200 Series Ascorlights. The Model AL-417 is $48.95; the Model BL-411 is $49. Both fit Series 6 adapter—rings or step-up rings to Series 6. Ektachrome E-2 guide numbers are given as 25 for the BL-411 and 50 for the AL-417. A Continuous Light Adapter is $65.

► The Graflex Corporation, Rochester 3, N. Y., markets a Circular Light Unit with special connections for use with Stroboflash Power Packs I, II, III and IV. List price is $49. Kodachrome guide numbers are given as 11 to 20 depending on power pack.

► Heiland Division of Minneapolis-Honeywell, 5200 East Evans Avenue, Denver 22, Colo., offers the Prox-O-Lite for the Strobonar 62B Power Pack. Conversation kits and adapters available for use with the Strobonar 62A and 71A are $2.45 and $7.45 respectively. Kodachrome guide numbers are given as 9 or 13 depending on power pack. Price of the Prox-O-Lite is $42.50.

► Photo Lectronic Research, 141 West 42 Street, New York, N. Y., markets a Macro-Light Model PLR 200 for Braun and Mecablitz units. Kodachrome guide number is given as 15. Price of the Macro-Light is $69. Focusing lamps built into the flash head are $11 per pair. Adaptation for units other than Braun or Mecablitz is $7.50.

► Speedlight Center, 128 West 32 Street, New York 1, N. Y., offers a Close-up Ring Series 6 (patented)—which accepts Series 6 adapter rings—and a Close-up Ring Series 7 (patented)—for Series 7 adapter rings. The price of the smaller unit is $40.95; the larger unit sells for $50.95. Kodachrome guide number with Mighty Light power supply is given as 8.

FLUORESCENT

► Aristo Grid Lamp Products, Inc. 65 Harbor Road, Port Washington, N. Y., offers the Mic-O-Lite, a cold light ring with a 1¼-in. aperture for camera or microscope lens. The Mic-O-Lite, complete with power pack and warm-white tube, is $34.50. Interchangeable lamps of varied color down to 3650 angstrom units are $12.75 each. A 2537 angstrom unit Steri-Lamp is $18.50. Additional reflectors are $2.75 each.

► Hinelight Corporation, 2538 John Street, Fort Wayne, Ind., offers the Type B Hinelight. A light unit, with graded fluorescent rings, a safety switch, and relay; a Standard Adapter Kit for camera and tripod; and a current-regulating power transformer total $445 list.

TUNGSTEN

► Karl Heitz, Inc., 480 Lexington Avenue, New York 17, N. Y. offers a Circular Light System with the Alpa Macrostat equipment. The light system consists of a ring of 12 bulbs wired in series. The light can be dimmed between pictures by means of a rheostat. An opal glass plate permits the light system to be used in conjunction with a microscope as an object platform for transmitted light. The circular light with a horizontal arm (for attachment to the Macrostat pillar) and a rheostat is $69.90. THE END

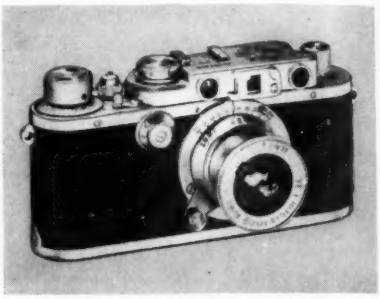
FILMSTRIPS

(continued from page 45)

thought or make a deletion—you must remake the entire filmstrip. This puts a premium on careful planning and errorless execution. Furthermore it demands that, if the filmstrip is subject to someone else's approval, final okay comes *before* production of the actual strip begins. All involved should be adequately forewarned.

How to line up copy

Aside from this general problem, the obstacle in filmstrip work with ordinary equipment is getting two pictures onto the 24.5 x 36.3mm (double frame) picture area of the 35mm camera. The standard frame size for filmstrip projectors is 24.5 x 18mm (single frame), arranged so that two frames side by side take up approximately the same space as one 35mm picture. Some still



Single-frame Leica "72"

cameras, such as the Leica "72" (recently discontinued), are single-frame cameras to begin with. Others can be converted by a camera repairman or a careful mechanic. But perhaps the simplest solution is one proposed by the Eastman Kodak Company in their *Photographic Production of Slides and Filmstrips.* It consists of a double picture frame which properly positions two consecutive filmstrip pictures (illustration, *page 45*). You put the copy into the frame, fill your ground glass (or parallax-corrected viewfinder) with the frame and shoot.

Naturally you want the finished product to be a transparent image with a quality suitable for projection. Which brings us to the question of what film to use. Filmstrips are made with all classes of film: direct positive; negative film printed on motion-picture print film; negative color printed on negative color print stock; and reversal color. The best for simple filmstrip work is reversal color such as Anscochrome, Ektachrome or Kodachrome. This goes for black-and-white as well as color filmstrips. These films eliminate the problem of grain. Since they are reversal materials in the first place, you need not make an original in negative form and then print it to make a positive. Furthermore you're probably accustomed to working with one of them, so you know their exposure characteristics and have a supply of your favorite on hand. But most important, they have excellent tonal characteristics for copying all sorts of material which you might wish to include in your first filmstrip. They produce adequate images of either line originals (such as printed type or engineering drawings) or continuous tone originals (such as black-and-

(continued on page 60)

PHOTO DEPARTMENT ANALYSIS

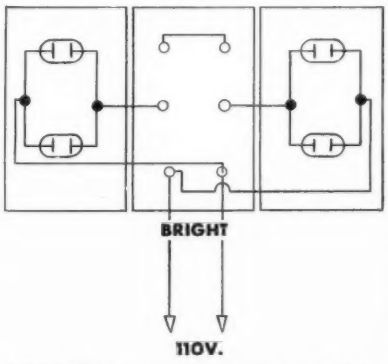
(continued from page 53)

until he hit upon the solution. He can turn individual lights on or off or automatically dodge in a circle to take out the corners on aerials.

The University Unit also has 5 x 7 and 8 x 10 contact printers. Enlargers are: 5 x 7 Elwood Condensing, 5 x 7 Durst, 5 x 7 Omega E3, 3 Omega D2's and 3 Leitz 35mm Focomats. Anderegg would like an 8 x 10 enlarger, but doesn't have the space. The unit makes many Kodagraph enlargements up to six or eight feet for the Ozalid machine even though there is no proper equipment to wash them.

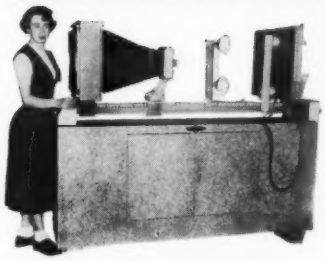
In the combination finishing room, office, lantern slide binding, repair shop, there's a drum type Pakolux washer and a large Lenz washer, both with temperature controlled, filtered water. For drying matte prints the Unit uses a large 50-in. Ideal drier. A Pako 3200 and a Telectro drier take care of glossy prints. An Eastman print straightener and a dry mounting press complete the print finishing apparatus.

Anderegg is not fully satisfied with the amount of work space presently available. He sees the need for increased color printing with Type C material, more shooting space in the studio, eventually a negative file. He is quite happy with the ability of the present Unit to turn out work but he feels that space for the photographic department must grow with the expansion of the University. There seems little doubt that it will. THE END



HERE'S what you need to make a Hi-Lo switch like the University of Michigan's *(page 32)*: three Handy boxes; one ⅜ BX connector; four ½-in. electric lock nuts and split adaptors; two duplex receptacles; two Handy box duplex covers; one 20 amp. double pole, double throw (DP-DT) switch and a cover for it; four ⅛-in. bolts and nuts.

MILLER-TROJAN



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Top reproductive quality, heavy steel and aluminum construction and features usually found only on expensive cameras combine to make the Sharpshooter your outstanding gallery camera buy. Features include 18 x 22½ copy board that tilts to horizontal position for easy loading . . . four 300 watt reflector flood lamps on pivotal arms . . . a reset timer that automatically controls shutter and lights . . . a Wollensak lens—with a focusing scale made to fit that lens . . . a cut film holder with focusing back that permits use of Autoscreen or other film up to 11 x 14 . . . and a lens board and copy board that move on a track with indicating arrows on both that line up with the correct focus number on the focusing scale. Camera measures only 42 x 72—enlarges twice and reduces three times—can be operated by semi-skilled labor. **Camera costs ONLY $795.00. Combination base and storage cabinet unit costs ONLY $112.75.**

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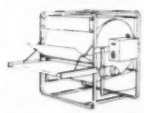

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FILMSTRIPS

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white prints, color prints or paintings). This is true because their tonal scale is abbreviated. They render very bright parts of the subject as nearly clear film and very dark parts of the subject as abject black, meanwhile doing a fairly smooth job of the middle tones. Their only inadequacy, ironically, is making copies of color transparencies. They exaggerate the already high contrast of Anscochrome, Ektachrome or Kodachrome originals and produce a color shift which is especially noticeable if a copy is made of a copy of a transparency, customary in production filmstrips.

Limit your subject matter

The corrective treatment for this problem of contrast and color shift is a contrast reduction and color correction mask of the type used in Dye Transfer print making. Without a single-frame camera, it is probably best to limit the subject matter to prints and drawings.

The best kind of original print for the type of filmstrip under discussion—or for any filmstrip for that matter—is one which is somewhat dark. It should range from a heavy gray (but not actual black) to veiled bright areas. The characteristics of the copy film will extend the range of tones.

Dye Transfer prints usually meet these requirements and make excellent filmstrip frames. So do Type C or Printon prints if they are "full" in tonal value. All can be easily combined on a single filmstrip—but you should aim for consistency. A somberly dark frame or a bleached-looking frame can jar the continuity of your filmstrip.

Getting the right exposure

Once you have your copy lined up, exposure is no great problem. Taking for granted that you are accustomed to the film which will make up the filmstrip, you should get acceptable results with a careful meter reading or a tested electronic flash unit guide number. You must, however, take into account the fact that if your lens is extended for an extreme close-up, the rated f-numbers no longer apply.

But with reasonable care, you can turn out a filmstrip with as many as 72 frames in the time it would take to make 36 2 x 2 slides, eliminate slide mounting and have an audio-visual device with impact—always compact and intact. THE END

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Complete (less battery) $79.50

Hold-It $3.95 **Fotoclamp $9.75**

Prox-O-Lite

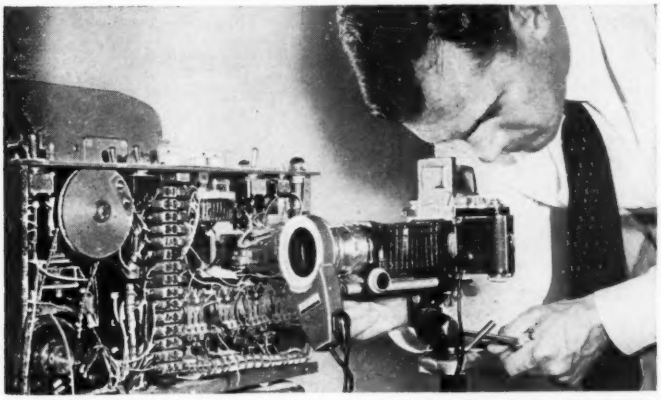
TRADE MARK

For extreme close-up photography this new Strobonar encircles the camera lens, giving a shadowless light without vignetting. Its mounting flange is threaded for a series VI adapter ring, and may be used with Series V or VII with the proper step rings. The Prox-O-Lite is designed for the Strobonar 62-B Power Pak, for the Strobonar 62-A (with 62-A Conversion Kit), or, if more light is desired, for the Strobonar 71-A Power Pak (with 71-A Adapter). Exposure tables which take into consideration the bellows factors that affect macro-photography are included in the instruction manual.

Prox-O-Lite Lamphead $42.50

62-B Power Pak $35.95 **62-A Conversion Kit $2.45** **Series 7 Adaptor Ring (Amer. Type) $3.95**

71-A Adapter $7.45



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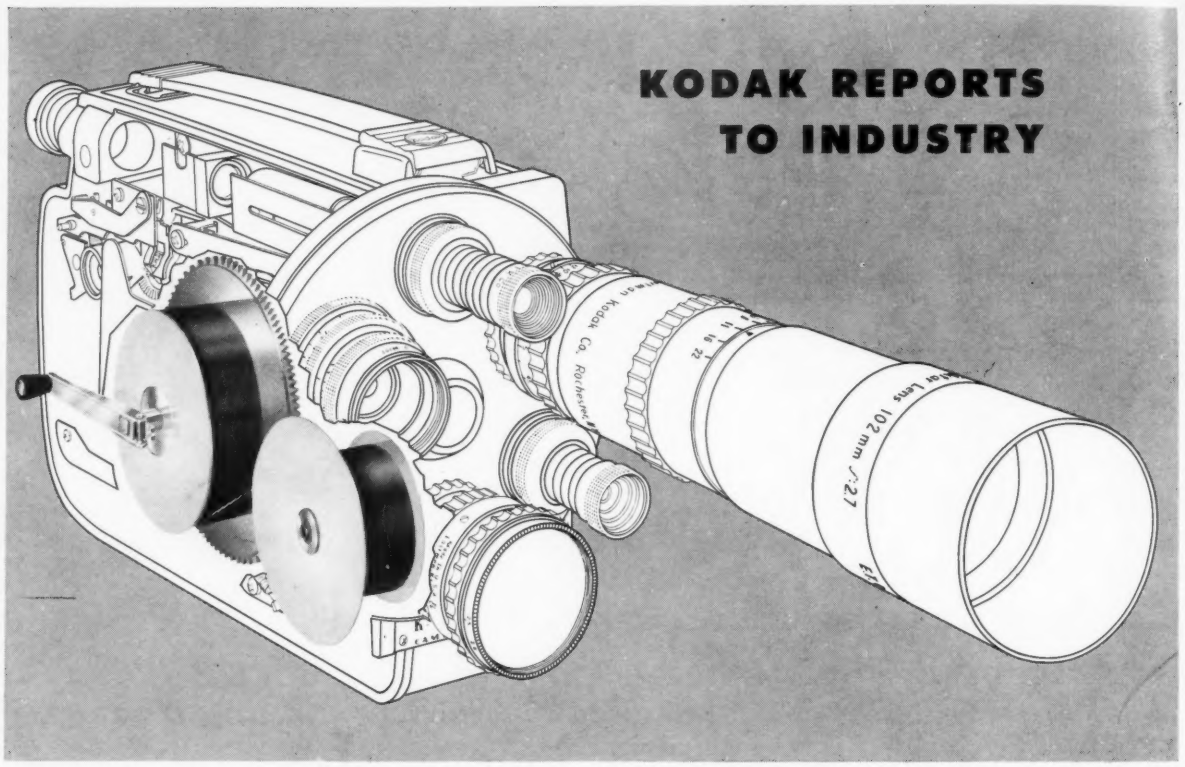

40-foot run on one winding leaves you free to do the unusual, to film long scenes without interruption. Exclusive with a Kodak K-100 Camera. The drive makes the difference. Its heart is a prestressed spring which uncoils powerfully from one drum to another. This *two-drum design* is a big improvement over conventional single-drum motors—helps provide a *steady* rate of speed throughout the 40-foot film run.

You can make fades, dissolves, other special effects, with auxiliary hand-crank, or attach an electric-motor drive. You have finger-tip control for locked-in run and single-frame exposure, too.

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EASTMAN KODAK COMPANY

Rochester 4, N. Y.

See page 13 for information on Kodak Movie Films.

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